



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Fogal et al.

Serial No.: 09/422,887

Filed: October 21, 1999

For: ANGULARLY OFFSET STACKED DIE
MULTICHIP DEVICE AND METHOD OF
MANUFACTURE

§
§ Group Art Unit: 2822
§
§ Examiner: Jamie Lynn Brophy
§
§
§ Atty. Docket: 95-0134.05
§
§

#23
BPP
7/12/03

REPLY TO THE EXAMINER'S ANSWER DATED APRIL 9, 2003

Mail Stop Appeal

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

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6/9/03
Date

Susan Jerome
Signature

Dear Sir:

Applicants herein respond to the Examiner's Answer dated April 9, 2003.

I. Section 5 of Examiner's Answer

Section 5 of the Examiner's Answer addresses the summary of the invention. The Examiner indicated that the summary's citations refer to the original Specification rather than the substitute Specification submitted subsequently. For the Board's convenience, Applicants reproduce the summary below with citations to both the original Specification and the substitute Specification.

Exemplary embodiments of the claimed invention concern a method of stacking a plurality of dies, wherein each die is angularly offset with respect to the orientation of an underlying die. (Original Specification at page 5, lines 21-22, and Figures 1 and 3; *see also* substitute Specification at ¶[0022].) Angular offsetting is accomplished by rotating a die within a

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plane that is parallel to the underlying die. (Original Specification at page 5, lines 23 and 24 (substitute Specification at ¶[0022]); page 4, lines 4-5 (substitute Specification at ¶[0012]).) The amount of rotation is described in terms of an angle between the longitudinal centerlines of one die and its underlying counterpart. (Original Specification at page 6, lines 1-3; substitute Specification at ¶[0022].) Moreover, the disclosure teaches that, in some embodiments, it is preferable to offset a die at an angle that is as small as possible without blocking access to the underlying die's bond pads. (Original Specification at page 5, lines 21-23; page 6, line 3; substitute Specification at ¶[0022].) A minimum angle is especially preferable if it is desired to stack the maximum number of dies while still ensuring clearance for the wire bonds leading to each die. (Original Specification at page 6, line 6 (designating the maximum number of dies as "N") (substitute Specification at ¶[0022]); Original Specification page 4, lines 6-8 (discussing ensuring that a lower die's bonding sites are not obstructed by an upper die) (substitute Specification at ¶[0012]); Original Specification page 5, line 28 – page 6, line 1 (indicating that die are stacked without interfering with the vertical line of sight of lower dies' bonding pads) (substitute Specification at ¶[0022]).) In a preferred embodiment, wire bonding of all bonding sites occur during the same wire bonding process. (Original Specification at p. 5, ln. 29 – p. 6, ln. 1; substitute Specification at ¶[0022].)

III. Section 10 of Examiner's Answer

Section 10 of the Examiner's Answer addresses the ground of rejection. Applicants note that this section appears to be taken verbatim from the final Office Action. (*Compare* Examiner's Answer at §10 *with* Office Action dated 7/2/02 at p. 3-4.) Accordingly, Applicants' Appeal Brief already refutes those grounds.

VI. Section 11 of Examiner's Answer

Section 11 of the Examiner's Answer includes the response to Applicants' arguments. This section is further subdivided to address different sets of claims. Applicants similarly subdivide this section of the Reply and present arguments directed to each set separately below.

A. Claims 7-8

The Examiner's answer to Applicants' arguments in support of claims 7-8 raise several issues addressed separately below. Applicants contend that any one or combination of the reply points addressed below justify the Board's reversal of the Examiner.

1. The Examiner's comments of a personal nature

After reciting de Givry's figure 3 and quoting excerpts from Applicants' Appeal Brief, the Examiner accused Applicants of confusing the reader and of mischaracterizing the terms "minimum" (used in claim 7) and "maximum" (as taught in de Givry). (Examiner's Answer at p. 5.) Applicants submit that the Examiner's accusation borders on violating the rule that "everything of a personal nature must be avoided" when choosing language for rejecting claims. (MPEP 707.07(d).) Applicants request that the Board not let the Examiner's comment distract from the defects in the Examiner's rejection.

2. Examiner's failure to give at least one claim limitation effect.

The Examiner then attempted to downplay claims 7's "minimum" limitation, in comparison to de Givry's "maximum" teachings, by characterizing the limit as being "merely a label or just a relative term." (Examiner's Answer at p. 5.) Applicants contend that the Examiner's characterization is in direct conflict with case precedent, which states that each limitation in a claim must be given effect. (*Ex parte Wolters*, 214 U.S.P.Q. 735, 737 (Pat. & Tr. Office Bd. App. 1979). A copy of this case is included in an appendix to this Reply.)

The Examiner then purported to broadly interpret claim 7's "minimum angular offset" to be "merely an offset angle that allows access to a bonding site on the lower die." (Answer at p. 5-6.) Significantly, the Examiner attempted to make this argument earlier during prosecution. (Office Action dated 10/17/01 at 5; *see also* Office Action dated 11/16/00 at p. 7.) Accordingly, Applicants have previously pointed out that the Examiner's conclusion that the phrase "minimum angular offset" is synonymous with anything that "allows access to a bonding site on the lower

die” results in unnecessary redundancy in claim 7, as there is already other claim language present addressing allowing access to a bonding site on the lower die. The redundancy resulting from the Examiner’s argument suggests a flaw in the Examiner’s reasoning.

Based on the Examiner’s argument, there would be no need for the phrase “minimum angular offset,” and the claim would effectively be broadened to

7. (Implicit amendment attempted by Examiner) A method of stacking a plurality of die,
comprising

mounting an upper die on a lower die; and

[defining a minimum angular offset] with said mounting, [wherein said minimum angular offset allows] allowing access to a bonding site on said lower die.

This is not what Applicants claimed. By finding two phrases in the claim to be synonymous, the Examiner has effectively ignored the import of at least one of the phrases. As a result, the Examiner has further demonstrated the failure to satisfy case precedent requiring that each limitation in a claim be given effect. (*Wolters*, 214 U.S.P.Q. at 737.)

Moreover, Applicants contend that the Examiner’s attempt to apply a broader interpretation than the one indicated by the Specification contradicts the standard set forth in *Vitronics Corp. v. Conceptronic Inc.* (90 F.3d 1576, 39 U.S.P.Q.2d 1573, 1576-77 (Fed. Cir. 1996) which indicates that the Examiner’s definition of a term may not contradict the import of the other parts of the specification. (See *id.* at 1578.) Significantly, the Federal Circuit emphasized in that case that

the specification is always highly relevant to the claim construction analysis. Usually it is dispositive; it is the single best guide to the meaning of a . . . term.

(*Id.* at 1577.) The Federal Circuit subsequently reiterated that the definition arrived at by the Examiner cannot “contradict any definition found in or ascertained by a reading of the patent documents.” (*Id.* at 1578 n.6.)

As applied to the current facts, Applicants have repeatedly directed the Examiner to the relevant parts of the Specification concerning the definition of “minimum angular offset.” Applicants provided such direction at least as far back as 7/16/01, when Applicants summarized

the invention, citing support in the Specification, in a brief as part of an earlier appeal process. The Examiners attempt at “broadly” interpreting the term despite such guidance demonstrates a failure to meet *Vitronic*’s standard, thereby warranting the Board’s reversal of the Examiner.

As mentioned above, the issues of the effect of claim 7’s “minimum” requirement and the standards in determining the definition of that term have arisen previously in prosecution. Accordingly, Applicants addressed the issues in the Response to the Office Action dated 10/17/01 (mailed 2/19/02 – *see* p. 5-7.) The Examiner’s subsequent Office Action (dated 7/2/02) made a general announcement that the Response’s arguments were unpersuasive (*see* p. 5) but did not appear to directly address the effect of claim 7’s “minimum” requirement and the standards in determining the definition of that term (*see* p. 5-7). Hence, the Examiner has implicitly acquiesced to Applicants’ arguments on this issue. As a result, the Examiner’s waiting until the Answer to attempt to reassert this argument is insufficient and serves as further support for the Board’s reversal of the Examiner.

3. The Examiner’s argument results in a contradiction in terms.

The Examiner then opines that there can be “a range of minimum angular offset” that allow access to the bonding site on the lower die. (Answer at p. 6.) Applicants contend that the term “minimum” connotes an absolute smallest value and, as a result, there can be no “range” of minimum values. Applicants contend that the oxymoronic nature of the Examiner’s statement further demonstrates the untenable nature of the Examiner’s definition of “minimum angular offset” in particular and of the Examiner’s argument in general. As a result, the Board’s reversal of the Examiner is still further supported.

4. The Examiner’s admission of de Givry’s teachings that are contrary to the claim limitations.

The Examiner then attempts to argue that de Givry’s crossing two chips at 90 degrees discloses a minimum chip crossing angle. (Answer at p. 6 (citing de Givry’s figure 1).) The Examiner further supposes that reason de Givry crosses two chips at 90 degrees is to provide

symmetrical “dead areas” for auxiliary components. (*Id.*) Concerning the sheer act of de Givry’s crossing two chips at 90 degrees, Applicants have already indicated that such a crossing actually demonstrates a maximum crossing angle (Appeal Brief at p. 7-8.) Moreover, assuming the Examiner’s supposition concerning de Givry’s need for symmetrical dead areas is true, such a need only reinforces the requirement for a maximum chip crossing angle. Thus, the Examiner’s admission concerning de Givry’s disclosure and the Examiner’s reliance on this disclosure only serve to refute the rejection and further support the Board’s reversal of the Examiner.

5. The Examiner’s inapplicable analogy

The Examiner then attempted to argue that de Givry disclosed an offset angle of 135 degrees. In that attempt, however, the Examiner cited de Givry’s figures 1 and 3 and, more specifically, chips 14 and 26. However, claim 7 requires defining a minimum angular offset with a particular mounting. That mounting, in turn, concerns an upper die *on* a lower die. While de Givry’s chip 26 may be *over* chip 14, it is not *on* that chip, hence the Examiner’s attempted analogy fails; and the Examiner’s conclusion that de Givry’s maximum chip crossing angle discloses claim 7’s minimum angular offset is untenable.

6. The Examiner’s fear of consulting sources to define claim language is unfounded according to case precedent

The Examiner then indicated that the claims, not the Specification, is the measure of the invention, and that limits in the specification cannot be read into the claims. (Answer at p. 6) Applicants counter by pointing out that the Examiner has effectively ignored at least one of the claim limitations (*see* part 2 above) and that the Specification may be used to define claim terms. Applicants alert the Board that the Examiner’s statement represents the latest instance throughout prosecution concerning the Examiner’s reluctance to seek sources other than the claims themselves to define the claim language. (*See* Office Action dated 11/16/00 at p. 7; Office Action dated 10/17/01 at p. 5.) Applicants note that the Examiner’s conduct and arguments conflict with another tenet of *Vitronics*. Specifically, *Vitronics* holds that the plain

meaning and the Specification can be considered in interpreting the limitations. (*Vitronics*, 39 U.S.P.Q.2d at 1576-77.) Other case precedent contains language directly on point.

It is entirely proper to use the specification to interpret what the Patentee meant by a word or phrase in the claim. *But this is not to be confused with adding an extraneous limitation appearing in the specification*, which is improper. By "extraneous," we mean a limitation read into a claim from the specification *wholly apart from any need to interpret what the patentee meant by particular words or phrases in the claim*. "Where a specification does not require a limitation, that limitation should not be read from the specification into the claims."

(*E.I du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 7 U.S.P.Q.2d 1129, 1131 (Fed. Cir. 1988), *cert. denied*, 488 U.S. 986 (1988) (emphasis added) (citations omitted).) The Examiner's analysis throughout prosecution, including the Answer, has suffered from the very confusion that the Federal Circuit warned against.

Thus, in order to meet the standards set forth in case precedent, the Examiner should have first given meaning to all of the terms of claim 7. (See *Wolters*, 214 U.S.P.Q. at 737). Applicants submit that having done so would have resulted in interpreting the requirement that the "minimum angular offset allows access to a bonding site on the lower die" to mean that (1) there may be angular offsets that do not allow access to a bonding site on the lower die, but these are not within the scope of the claim; (2) there may be non-minimum angular offsets that allow access to a bonding site on the lower die (such as those disclosed by de Givry), but these, too, are not within the scope of the claim; and (3) there may be configurations that do not involve angular offset yet allow access to a bonding site on the lower die, but, once again, such configurations are not within the scope of the claim.

It then would have fallen to the Examiner to determine what constitutes a "minimum angular offset." For that, the Examiner should have considered the plain meaning of the terms in that phrase. (*Vitronics*, 39 U.S.P.Q.2d at 1576.) Had the Examiner deemed that additional consideration was required, case precedent would have directed the Examiner to consult the Specification. (*Id.* at 1576-77; *du Pont*, 7 U.S.P.Q.2d at 1131.) Applicants had in fact already directed the Examiner to the relevant parts of the Specification concerning the definition of "minimum angular offset," as demonstrated by the citations in the Appeal Brief's summary of the

invention, reprinted above in part I. (Applicants presented this summary, with citations to the Specification, in an earlier Appeal Brief submitted 7/16/01.)

Thus, the Examiner's latest arguments further demonstrates the Examiner's failure to act in accordance with the case precedent standards set forth above, which further warrants the Board's reversal of the Examiner with respect to claims 7-8.

7. The Examiner's misapplication of de Givry

The Examiner then refers to portions of Applicants' argument wherein Applicants refer to auxiliary components located in the crossed chips' "dead areas." (Answer at p. 6-7.) The Examiner answers by suggesting that the rejection relies on de Givry's figure 3, which does not illustrate auxiliary components. (*Id.* at p. 7.) The Examiner further assumes that the chip spacing in de Givry's figure 3 embodiment cannot accommodate auxiliary components. (*Id.*)

Applicants did in fact address de Givry's auxiliary components and how de Givry's chips must be crossed at the maximum angle in order to accommodate those components. (Appeal Brief at p. 7-8.) Moreover, the Examiner did so too in the Answer, citing de Givry's figure 1. (See Answer at p. 6, addressed above in part 4). Hence, the Examiner's claim to be relying on de Givry's figure 3 to the exclusion of de Givry's figure 1 is untenable.

The Examiner's claim is even more untenable when de Givry is considered as a whole and the excerpts relied upon by the Examiner are considered in context. Significantly, de Givry discusses generally the aims of its "present invention" – including increasing layout density. (de Givry translation at p. 3.) This is achieved by crossing the chips and placing "small" and "necessary" components between the arms of de Givry's crossed chips. (*Id.* at 4.) De Givry's figure 1 in fact shows those components. (*Id.* at Fig. 1, elements 22 and 24.) De Givry's figure 3 does not show such components, but Applicants contend that figure 3's lack of disclosure cannot be reasonably interpreted to mean that auxiliary components are completely absent from that de Givry embodiment. Rather, Applicants contend that it is more reasonable to interpret de Givry's figure 3 as focusing on how four chips may be configured, with other elements of the module, such as the supporting substrate and auxiliary logic and capacitors, being understood to exist without the need to illustrate them. Applicants' interpretation is supported by de Givry's indication

that those auxiliary components are generally present as part of the broad invention and that it is “necessary” to include such components, as cited above. As for the Examiner’s assumption that that the chip spacing in de Givry’s figure 3 embodiment cannot accommodate auxiliary components, Applicants contend that the assumption is not only unfounded but is actually refuted by de Givry itself, which describes such components as “small” and “necessary,” again as cited above.

8. The Examiner’s continued misapplication of de Givry

The Examiner then refers to portions of Applicants’ argument wherein Applicants point out that de Givry’s requirement of supporting the ends of its chips conflict with claim 7’s requirement of a minimum angular offset that allows access to a bonding site on the lower die. (Answer at p. 7.) In attempting to refute this argument, however, the Examiner admits that de Givry’s crossed chips could exhibit a smaller angular offset but that such an offset “would not provide enough space for the supports” (Answer at p. 7), thereby echoing Applicants’ own point. The Examiner attempts to argue that the smaller angular offset would also interfere with access to the bonding site on the lower die. Applicants contend that a careful examination of de Givry’s figure 3 illustrates that, but for the concern with supporting the chip ends, de Givry’s chips could define a smaller angular offset that would not interfere with access to the bonding site on a lower die.

B. Claims 9-11

The subsection of the Examiner’s Answer responding to Applicants’ arguments in favor of claims 9-11 is predominantly a restatement of (1) the basis for rejection; (2) the Examiner’s interpretation of Applicants’ arguments; and (3) the Examiner’s attempt to defend against a previous admission that refutes rejection. (Answer at p. 7-9.) As these statements are substantially similar to those made by the Examiner in the final Office Action dated 7/2/02, Applicants have already addressed those issues in the latest Appeal Brief (*see* p. 8-10) and do not see the need to repeat those arguments here.

However, the last paragraph of this subsection of the Answer raises some new points. Specifically, the Examiner indicates that it is not clear how de Givry suggests attaching a set of four chips, cabling that set, then stacking an additional set thereon. (Answer at p. 9.) First, Applicants contend that such a suggestion will be clear to the Board upon review of Applicants' arguments on pages 8-9 of the latest Appeal Brief. Second, Applicants note that, immediately after expressing puzzlement, the Examiner admits to at least one instance where de Givry expresses attaching a set of chips, cabling that set, then stacking an additional set thereon. Applicants contend that, when read in context of the whole of de Givry, such examples suggest that the attaching/cabling/stacking steps apply to sets of four chips as well as others. Again, Applicants provide further detail for this in the latest Appeal Brief at p. 8-10.

Nevertheless, the Examiner answered that de Givry never teaches a stack that comprises more than four chips. (Answer p. 9.) Based on that assumption, the Examiner concludes that de Givry's figure 3 embodiment, wherein four chips are stacked and subsequently cabled, could represent all of the chips in a device. In refutation of the Examiner's assumption, Applicants direct the Board to de Givry's abstract and independent claims, all of which broadly refer to a "plurality" of chips. De Givry's claim 1 goes even further to broadly address "at least two chips" that are stacked and crossed. Thus, de Givry expressly teaches a stack that could comprise more than four chips. Because the Examiner's assumption is incorrect, the Examiner's conclusion based on that assumption is untenable.

The Examiner adds that, even if de Givry does teach attaching a set of four chips, cabling that set, then stacking an additional set thereon, so does the current Specification. (Answer at p. 9.) However, as the Examiner indicates elsewhere in the Answer and throughout prosecution, the focus is the appealed claims and the limitations expressed therein. Claim 9 requires ensuring that the act of stacking *all* dies of a multichip module occurs with no intervening bonding step; claim 10 requires stacking *all* dies of a multichip module before bonding wire to the dies; and claim 11 requires bonding wire to a multichip module's dies only after stacking *all* of those dies. Hence, claims 9-11 do not rely upon the particular Specification excerpt cited by the Examiner. As a result, the Examiner's reliance on that excerpt has no bearing.

C. Claim 12

In answering Applicants' arguments in favor of claim 12, the Examiner begins by briefly restating the basis for rejection and indicating that de Givry need not teach the limitation word-for-word. (Answer at p. 9.) Regardless of de Givry's terminology, Applicants contend that the rejection has been refuted in the Appeal Brief (*see* page 10). The Examiner in fact subsequently attempts to paraphrase Applicants' arguments therein. (Answer at p. 9-10.) The Examiner then attempts to counter those arguments by submitting that, even if de Givry's crossed chips define the maximum angle, that angle may also be marginally clearing a line of sight as required by claim 12. The Examiner supports this by asserting that reducing the cross angle of the chips in de Givry's figure 3 would block the relevant line of sight. However, as addressed above in part (A)(8), the Examiner has admitted that de Givry's crossed chips could exhibit a smaller angular offset but that such an offset "would not provide enough space for the supports." (Answer at p. 7.) Applicants also continue to maintain that a careful examination of de Givry's figure 3 illustrates that, but for the concern with supporting the chip ends, de Givry's chips could define a smaller angular offset that would not interfere with access to the bonding site on a lower die. Hence, the Examiner's admissions, as well as the Examiner's reference, refute the Examiner's answer.

D. Claims 13-16

The Examiner's answer concerning claims 13-16 is similar to the portion of the answer addressing claim 12. Accordingly, Applicants' reply is also similar. Specifically, the Examiner briefly restated the basis for rejection and argued that, even if de Givry's crossed chips define the maximum angle, their dimensions and layout also define a minimum bond pad clearance. However, as addressed above, Applicants contend that a careful examination of de Givry's figure 3 illustrates that de Givry's chips could further minimize bond pad clearance, but the concern with supporting the chip ends (as indicated by the Examiner on page 7 of the Answer), prevents that.

E. Claim 17

The Examiner's answer concerning claim 17 contains a reassertion that de Givry's figure 3 embodiment, wherein four chips are stacked and subsequently cabled, could represent all of the chips in a device. (Answer at p. 10-11.) However, Applicants have already refuted that assertion above in part B. The Examiner then posits that, even if de Givry's chips are crossed at a maximum angle, the underlying bond pad clearance is less than maximum. (Answer at p. 11.) Applicants contend that the self-contradictory nature of the Examiner's position renders that position untenable. This contradiction is exacerbated when, despite just having assumed de Givry's chips to be crossed at a maximum angle, the Examiner indicates that the underlying bond pad clearance cannot be smaller.

F. Policy

In answer to Applicants' arguments concerning reversal on policy grounds, the Examiner first addressed the incompleteness of the Examiner's action and failure to answer all material traversed. However, in attempting to do so, the Examiner admitted failing to address the *Spectra* case (Answer at p. 11), thereby conclusively demonstrating the failure to satisfy the MPEP's requirements of completeness of the Examiner's action and answering all material traversed. In further attempt to defend this failure, the Examiner stated that Applicants' arguments were directed mostly to the *Vickers* case. (*Id.*) Without acquiescing to the Examiner's portioning of Applicants' Response, Applicants note that MPEP §707.07(f) does not require answering *most* of the material traversed; rather, it requires answering *all* of the material traversed. Applicants contend that the Examiner's ignoring the analysis of the *Spectra* case (and of MPEP §2164.08(b)) represented a failure to answer the substance of Applicants' traversal.

The Examiner further attempted to defend this failure by arguing that a response addressing both *Spectra* and *Vickers* would have been cumulative. Applicants submit that, had the Examiner's response applied to *Spectra* as well as *Vickers*, the Examiner could have simply cited both cases instead of just one. The fact that the Examiner did not include *Spectra* in a string cite along with *Vickers* suggests that *Spectra* deserved its own analysis; and the fact that

the Examiner failed to analyze *Spectra* demonstrates a failure to satisfy the policy considerations of MPEP §707.07.

The Examiner also claimed that time and brevity was the reason for the response being “only about three pages.” (Answer at p. 12.) Applicants contend that such considerations do not take precedence over the express requirements of the MPEP to answer all material traversed.

The Examiner then addressed the piecemeal nature of the Examination. Specifically, the Examiner indicated that new rejections become apparent as the Examiner gains a better understanding of the invention. Applicants note, however, that the original Specification is less than seven pages long. Applicants further note that the 11 claims being appealed have been present in the same form since the day of filing the appealed application – 10/21/99; moreover, those 11 claims have been the only claims pending. In addition, de Givry contains only nine pages of substantive text and six pages of drawings and, as mentioned in the Appeal Brief, was cited on the day of filing the appealed application. Applicants submit the brevity of the application and reference combined with the prompt citation of that reference as well as the low claim count and lack of claim amendment since the Preliminary Amendment suggest that the Examiner could have gained sufficient understanding of the invention so as to articulate the current rejections long before the Office Action dated 7/2/02.

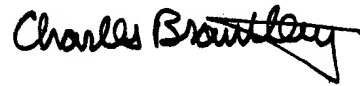
The Examiner also indicated that the specific figures and text mentioned are exemplary and not exclusionary of the rest of the reference. Applicants counter that it is the Examiner’s burden to clearly, completely, and promptly articulate all valid grounds for rejection. (MPEP §707.07.) Expecting Applicants to divine such grounds denies Applicants a full and fair opportunity to respond and prevents rational isolation and determination of issues which may be present. (See *In re Herrick*, 344 F.2d 713, 145 U.S.P.Q. 400, 401 (C.C.P.A. 1965).)

As a result, Applicants contend that the Examiner’s answer is insufficient to refute reversal as supported by policy considerations. In fact, the Examiner’s admissions provide additional basis for reversal as supported by policy considerations, as do the Examiner’s comments of a personal nature (*see* section (A)(1) above).

VII. Conclusion

The Examiner's Answer represents a collection of (1) comments of a personal nature; (2) a failure to give at least one claim limitation effect; (3) self-contradictory arguments; (4) misapplications of de Givry; (5) a failure to consider the Specification in attempting to define a term; and (6) admissions that further indicate failure to carry out PTO policy. Any one or combination of these justify Applicants' repeated request that the Board reverse the Examiner, withdraw the rejections, and allow the claims.

Respectfully submitted,

A handwritten signature in black ink that reads "Charles Brantley". The signature is stylized with a long, sweeping horizontal line extending from the end of the name.

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Appendix 1:

Ex parte Wolters, 214 U.S.P.Q. 735 (Pat. & Tr. Office Bd. App. 1979).

C

Ex parte Wolters and Kuypers

Patent and Trademark Office Board of Appeals

Opinion dated June 13, 1979

Patent No. 4,343,896 issued Aug. 10, 1982

United States Patents Quarterly Headnotes

PATENTS

[1] Claims -- Indefinite -- In general (§ 20.551)

Rejection under 35 U.S.C. 112 of claims, to kit each part of which is interrelated with others, that are clear and precise and are completely understandable to those skilled in art is not sustained.

PATENTS

[2] Specification -- Claims as disclosure (§ 62.3)

Claims in application, as filed, constitute part of original disclosure.

PATENTS

[3] Construction of specification and claims -- By Specification and drawings -- In general (§ 22.251)

Disclosure of application embraces not only what is expressly set forth in words or drawings, but what would be understood by persons skilled in art; those features that are well known are as if they were written out in patent.

PATENTS

[4] Pleading and practice in Patent Office -- Rejections (§ 54.7)

Burden of establishing prima facie case of obviousness falls upon examiner; therefore, evidence upon which examiner relies must clearly indicate that worker of routine skill in art would view claimed invention as being obvious, as meant by 35 U.S.C. 103

PATENTS

[5] Pleading and practice in Patent Office -- Rejections (§ 54.7)

Examiner's burden of supporting his holding of unpatentability is not met by "assuming" presence of missing component.

PATENTS

[6] Construction of specification and claims -- Broad or narrow -- In general (§ 22.101)

Construction of specification and claims --

Introductory phrase (§ 22.55)

Examiner's concern over breadth of claims due to use of word "comprising" is no excuse for ignoring claim preamble; each limitation in claims must be given effect.

PATENTS

Particular patents -- Test Pack

Wolters and Kuypers, Method for the Demonstration and Determination of an Antigen or Antibody, rejection of claims 10-13 reversed.

*735 Appeal from Group 171.

Application for patent of Gerrit Wolters and Leonardus Paulus Clemens Kuypers, Serial No. 653,579, filed Jan. 29, 1976. From decision rejections claims 10-13, applicants appeal (Appeal No. 372-05). Reversed.

Robert H. Falk and Francis W. Young, both of Asheville, N.C., and Charles A. Wendal, Arlington, Va., for appellants.

Before Merker and Katz, Examiners-in-Chief, and Pellman, Acting Examiner-in-Chief.

Pellman, Acting Examiner in Chief.

This is an appeal from the examiner's decision finally rejecting claims 10 through 13, remaining claims 1 through 9 having been allowed.

The subject matter on appeal involves "a test pack" or kit for detecting and determining an antigen (claims 10 and 11) or an antibody (claims 12 and 13) in a fluid sample. Claim 10 is reproduced as follows to serve as a more detailed description:

10. A test pack for the detection and determination of an antigen in a fluid sample, comprising:

- a. a given amount of a first antibody against the antigen to be determined;
- b. a given amount of a labelled second antibody against said antigen, said second antibody being produced in a different animal species than the first antibody;

*736 c. a given amount of an insolubilized antibody against said first antibody.

In his Answer, the examiner cites the following reference:

Prince et al., The Lancet, 1346-1350 (1973).

All of the claims stand rejected for failing to point out the invention with particularity (35 USC 112, second paragraph) and for being based upon an inadequate specification (35 USC 112, first paragraph). The examiner, in defense of his position as to the urged defect of the claims, asserts that the claim recitations are directed to "an assembly of reagents" having no physical cooperation amongst the various components. He then explains that "the assembly is not an integral structural unit."

Appellants respond to the examiner's arguments with the citation of issued patents having claims to kits, as precedent, and the citation of several decisions, including *In re Venezia*, 530 F.2d 956, 189 (CCPA 1976), for legal authority.

We have no doubt that the present claims comply with the statutory requirements of 35 USC 112. Attention is invited to the explanation provided by the court at page 151 of the decision in *In re Venezia*, supra:

"As we view these claims, they precisely define a group or 'kit' of interrelated parts. These interrelated parts may or may not be later assembled to form a completed connector. * * * The claimed invention does include present structural limitations on each part, which structural limitations are defined by how the parts are to be interconnected in the final assembly, if assembled. * * *"

[1] As with the kit in the *Venezia* case, each part of the test pack herein is interrelated with the others. We find the claims clear and precise. Since there appears to be no persuasive reason why the claims would not be completely understandable to those skilled in this art, the rejection will not be sustained.

With respect to the adequacy of appellants' specification, the examiner criticizes the absence of a "specific embodiment of the test pack claimed." Also, he questions how the reagents are packaged and inquires as to the physical forms in which they are provided. Rule 71(b), 37 CFR 1.71(b), is cited.

Appellants' arguments to this rejection appear in the reply brief and amendment under 37 CFR 1.193(b) and in the supplemental reply brief. In the amendment,

appellants seek to add to the specification, language identical to that in the appealed claims.

[2][3] We shall not sustain this rejection. The claims in the application, as filed, constitute part of the original disclosure. In *re Myers*, 56 CCPA 1129, 410 F.2d 828, 161 USPQ 668. This would appear to be sufficient disclosure to describe the claimed test packs. Although the physical characteristics are not identified, we do not view such omission as a breach of the statutory requirements. The disclosure of an application embraces not only what is expressly set forth in words or drawings, but what would be understood by persons skilled in the art. Those features that are well known are as if they were written out in the patent. In *re Folkers et al.*, 52 CCPA 1269, 344 F.2d 970, 145 USPQ 390. Manifestly, neither the particular type of package nor the physical state and quantity of the reagents constitutes the essence of the claimed invention. These are merely incidental features and their selection are well within the routine competency of one skilled in the field.

All of the claims also stand rejected for being unpatentable (35 USC 103) over the Prince et al. publication item. At page 4 of the Answer, the examiner asserts:

"No patentable invention is seen in collecting various reagents in Prince's laboratory and placing them in a portable container. In the section of this Answer designated 'Description of the Prince Reference' the various pertinent reagents are specifically referred to."

At pages 2-3 of the Answer, the examiner describes the Prince et al. teaching as follows:

"Prince teaches an immunoassay for hepatitis-B antigen (HBAG). In the section designated 'Materials and Methods,' Prince describes an HBAB-coated tube and a radioactive labeled version of the HBAB; these antibodies are derived from guineapig sera. Prince also describes antibody materials present in his laboratory which are derived from rabbits -- see bottom of column 1, page 1347. The presence in Prince's laboratory of antibodies from other vertebrate specie [sic] is assumed -- see top of column 2, page 1349. Note that the Prince laboratory contains HBAG -- column 1, page 1347, lines 49-53."

After carefully considering the Prince et al. disclosure in light of all the comments directed thereto, we do not

find the examiner's position to be well taken. Accordingly, this rejection will not be sustained.

[4] The burden of establishing a prima facie case of obviousness falls upon the examiner. Therefore, the evidence upon which the examiner relies must clearly indicate that a worker of routine skill in this art would view the claimed invention as being obvious, as meant by 35 USC 103. It is our opinion that the examiner has failed to discharge his burden of presenting a case of prima facie obviousness.

[5] A particularly relevant disclosure of Prince et al. is set forth at page 1349. Here the authors refer to the "use of HBAb prepared in different species for bound and labelled *737 reagents (e.g., chimpanzee super125 I- HBAb in a system with guineapig HBAb bound to the tube). * * *" These two antibodies would seem to correspond to the recited components "b." and "a.", respectively of claim 10, for example. However, we are unable to find any disclosure or suggestion of component "c.", i.e., an insolubilized antibody against guineapig HBAb. The examiner's burden of supporting his holding of unpatentability is

not met by "assuming" the presence of the missing component.

[6] Moreover, in any event, although we appreciate the examiner's concern over the breadth of the claims (due to the use of the word comprising), this is no excuse for ignoring the claim preamble, i.e., "[a] test pack. * * *" Each limitation in the claims must be given effect. In re Boe et al., 505 F.2d 1297 184 USPQ 38 (CCPA 1974). On the record before us, we are convinced that the preamble constitutes a proper limitation and would not be interpreted by workers of routine skill in the art as embracing an established laboratory, such as that of Prince et al.

For the reasons discussed above, the examiner's decision rejecting claims 10 to 13 is reversed.

Reversed.

P.T.O. Bd.App.

214 U.S.P.Q. 735

END OF DOCUMENT

Appendix 2:

Vitronics Corp. v. Conceptoronic Inc., 90 F.3d 1576, 39 U.S.P.Q.2d 1573 (Fed. Cir. 1996).

39 U.S.P.Q.2d 1573
 90 F.3d 1576, 65 USLW 2124
 (Cite as: 39 U.S.P.Q.2d 1573)

▽

Vitronics Corp.
 v.
 Conceptronic Inc.

U.S. Court of Appeals Federal Circuit

No. 96-1058

Decided July 25, 1996

Action by Vitronics Corp. against Conceptronic Inc. for patent infringement. From judgment as matter of law that plaintiff failed to prove infringement, plaintiff appeals. Reversed and remanded.

Related decision: 27 USPQ2d 1046 .

James J. Foster, Lawrence M. Green, and Brett N. Dorny, of Wolf, Greenfield & Sacks, Boston, Mass., for plaintiff-appellant.

United States Patents Quarterly Headnotes

PATENTS

[1] Patent construction -- Claims -- Defining terms (Section 125.1305)

Term "solder reflow temperature," as used in claim for method of reflow soldering electrical devices to printed circuit boards, must be construed to mean "peak reflow temperature" of solder rather than lower "liquidus temperature" of solder, since "peak reflow temperature" and "liquidus temperature" are given distinctly different meanings in specification, and since claim, in order to be consistent with specification and preferred embodiment described therein, must be construed such that "solder reflow temperature" means peak reflow temperature.

PATENTS

[2] Patent construction -- In general (Section 125.01)

Federal district court may rely on expert testimony and other extrinsic evidence to help it understand underlying technology in patent case, but may rely on expert testimony concerning proper construction of disputed patent term only in rare event that patent documents, taken as whole, are insufficient to enable court to construe disputed term; even then, prior art documents and dictionaries are more reliable guides than opinion testimony on claim construction, which is no more reliable than opinion testimony on statutory construction and should therefore be treated with utmost caution.

PATENTS

Particular patents -- Electrical -- Circuit boards

4,654,502, Furtek, method for reflow soldering of surface mounted devices to printed circuit boards, judgment of non-infringement as matter of law reversed.

*1573 Appeal from the U.S. District Court for the District of New Hampshire, Loughlin, J.

Paul J. Hayes and Dean G. Bostock, of Weingarten, Schurgin, Gagnebin & Hayes, Boston, for defendant-appellee.

Before Michel and Lourie, circuit judges, and Friedman, senior circuit judge.

Michel, J.

Vitronics Corporation ("Vitronics") appeals the September 27, 1995 order of the United States District Court for the District of New Hampshire, Civil Action No. 91-696-L, entering judgment as a matter of law that Vitronics did not prove that Conceptronic, Inc. ("Conceptronic") infringed claim 1 of U.S. Patent No. 4,654,502 ("the '502 patent"). The appeal was submitted for decision after oral argument on May 8, 1996. Because we conclude that the specification of the '502 patent dictates a claim interpretation in accordance with the plaintiff's proposed construction, and that, so construed, the '502 patent may have been infringed, we reverse the trial court's decision and remand for further proceedings.

BACKGROUND

The Patented Invention

Vitronics and Conceptronic both manufacture ovens used in the production of printed circuit boards. The ovens are used to solder electrical devices (such as resistors, *1574 capacitors and integrated circuits) to the boards. Several methods of soldering devices to boards have been developed; the '502 patent, assigned to Vitronics, is directed to one of those methods.

Specifically, the '502 patent is directed to a method for the reflow soldering of surface mounted devices to a printed circuit board in which the circuit board is moved by a conveyor through a multizone oven. In this process, a solder paste is placed on the circuit board and the devices to be soldered (with attached

connectors) are placed on the paste. The circuit board is then placed on what is basically a conveyor belt running through an oven and passing through several different heating zones. In the final and hottest zone, the solder paste melts and forms a connection between the device and the circuit board. The boards remain in the last heating zone for only a short duration, allowing the solder to reach a temperature high enough to cause the solder to melt and reflow while maintaining the devices themselves below the solder reflow temperature. Due to this temperature differential, the solder flows up the device connectors to form a solid connection.

Claim 1 of the '502 patent, the only claim at issue in this appeal, reads as follows (with added emphasis on the disputed terms):

1. A method for reflow soldering of surface mounted devices to a printed circuit board comprising:

moving a printed circuit board having solder and devices disposed on a surface thereof through a first zone and in close proximity to a first emitting surface of at least one nonfocused infrared panel emitter, said first emitting surface being at a first panel temperature;

moving said board through a second zone and in close proximity to a second emitting surface of at least one nonfocused infrared panel emitter, said second emitting surface being at a second panel temperature lower than said first panel temperature; and

moving said board through a third zone and in close proximity to a third emitting surface of at least one nonfocused infrared panel emitter, said third emitting surface being at a third panel temperature higher than said second panel temperature, said third emitting surface heating said board and said solder to a *solder reflow temperature* for a period of time sufficient to cause said solder to reflow and solder said devices to said board while maintaining the temperature of said devices below *said solder reflow temperature*.

Proceedings Before the District Court

This action was brought on November 26, 1991 by Vitronics against Conceptronic for infringement of both the '502 patent and U.S. Patent No. 4,833,301 ("the '301 patent"). [FN1] At the time the suit was filed, Conceptronic was selling the "Mark series" line of ovens. Conceptronic later discontinued the Mark series and began selling the "HVC series" line of ovens. Prior to trial, the parties stipulated that every

limitation of claim 1 of the '502 patent was met by the HVC series of ovens, except the limitation requiring the utilization of "nonfocused infrared panel emitters" and the limitation that the temperature of the devices must be maintained below the "solder reflow temperature." [FN2]

Vitronics, by way of a request for a jury instruction, asked the court to construe the meaning of the "solder reflow temperature" limitation. The specific instruction sought by Vitronics was as follows:

~~In considering the question of whether the '502 method patent has been infringed by the Mark and HVC Series ovens, you have to decide whether, in use, those ovens maintain the temperature of the devices below the solder reflow temperature. The phrase "solder reflow temperature" in the '502 patent means the temperature reached by the solder during the period it is reflowing during the final stages of the soldering process, sometimes referred to as the "peak solder reflow temperature." It does not mean the "liquidus temperature," the temperature at which the solder first begins to melt. Thus, if the temperature of the devices stays below that of the solder, the '502 method patent is infringed by the Mark and HVC Series ovens.~~

Thus, Vitronics contended that, as used in the claim, solder reflow temperature means peak reflow temperature, *i.e.*, a temperature approximately 20 degrees C above the liquidus temperature, at which the solder is completely melted and moves freely. Conceptronic, on the other hand, contended that solder reflow temperature means 183 degrees C, *i.e.*, the liquidus temperature of a particular type of solder known as 63/37 (Sn/Pb) solder. [FN3]

*1575 The district court delayed construing the disputed language until the close of testimony, at which time it ruled in favor of Conceptronic and concluded that the term "solder reflow temperature" as used in claim 1 refers to 183 degrees C. Vitronics then conceded that the court was required to grant judgment as a matter of law in favor of Conceptronic, as Vitronics had not presented any evidence of infringement under the court's interpretation of solder reflow temperature. This appeal followed.

Claim Construction Aids Before the District Court

In spite of Vitronics' early request for a jury instruction on the proper claim construction, the district court delayed announcing its claim construction until hearing all the evidence put forth at trial. During

trial, and in their briefs to the district court in support of their respective claim constructions, the parties discussed the patent specification, expert testimony, prior testimony and writings of Vitronics and its employees, and technical references. The most pertinent materials are discussed below. *The Patent Specification*

Vitronics relied heavily upon the patent itself to support its asserted claim construction. Although Vitronics conceded that the term "solder reflow temperature" may be ambiguous when considered in isolation, it argued that the specification clearly shows that, as used in the claim, solder reflow temperature means peak reflow temperature rather than the liquidus temperature. In particular, Vitronics pointed to that part of the specification that describes a preferred embodiment:

A preferred embodiment of the invention for reflow soldering of surface mounted devices to printed circuit boards will now be described. The printed circuit boards are typically made of epoxy-glass, such as fire retardant 4(FR- 4), or polyamide glass. These boards typically degrade above temperatures of 225 degrees C. The solder may be, for example, 60/40 (Sn/Pb), 63/ 37 (Sn/Pb), or 66/2 (Sn/Pb/Ag), all of which have a liquidus temperature (*i.e.* begin to melt) of about 190 degrees C. and a peak reflow temperature of about 210 degrees -218 degrees C. Thus, to effect reflow soldering without damaging the board, the solder must be allowed to reach a temperature of at least 210 degrees C., but the board cannot reach a temperature of 225 degrees C.

... The board is then sent into a fifth zone 5 to bring the temperature of the board up to a temperature of approximately 210 degrees C., the devices up to approximately 195 degrees C., and the solder up to approximately 210 degrees C. for a period of time of from about 10 to about 20 seconds to cause the solder to flow. Because the devices are cooler than the board, the solder flows up the devices. ... The board spends approximately 60 seconds in the fifth zone, but only about 10 to 20 seconds at 210 degrees C. Thus, the board is at the solder reflow temperature for only a short period of time and the devices never reach the solder reflow temperature.

Vitronics pointed out that, in the example described as the preferred embodiment, the temperature of the solder is raised to 210 degrees C, the peak reflow temperature, and the temperature of the devices is raised to 195 degrees C, 5 degrees above the 190

degrees C liquidus temperature. Thus, as argued by Vitronics, the term "solder reflow temperature" must be construed so that it refers to the peak reflow temperature because the claim requires that the temperature of the devices be maintained below "said solder reflow temperature"; if solder reflow temperature were construed to refer to liquidus temperature, the preferred embodiment would not be covered by the patent claims. *Expert Testimony*

Conceptronic relied heavily on the expert testimony of Dr. Rothe. Dr. Rothe testified that the meaning of the term "solder reflow temperature" in claim 1 is synonymous with liquidus temperature. Dr. Rothe further testified that the solder reflow temperature for 63/37 (Sn/Pb) is 183 degrees C. Dr. Rothe likewise testified at trial that several technical articles written by those skilled in the art supported his view that solder reflow temperature refers to liquidus temperature. *The Testimony of Mr. Hall*

Conceptronic also relied on the testimony of Mr. Hall, the Chief Engineer at Vitronics. At trial, Mr. Hall confirmed that during his deposition he had testified that the reflow temperature of solder was 183 degrees C. Mr. Hall also testified that, during his deposition, he had used solder reflow temperature to refer to liquidus temperature. However, at another point in his trial testimony, Hall explained *1576 that, while in his earlier deposition testimony he had used solder reflow temperature to refer to liquidus temperature, he did not suggest that was how the term was used in the patent. Rather, Hall testified the patent uses the term to refer to the peak reflow temperature. Paper Written By Former Vitronics Employee

Conceptronic also introduced into evidence a paper written by Phillip Zarrow, a former employee of Vitronics, defining solder reflow temperature in the following manner: "As the temperature of the solder paste on the interconnect passes the solder alloy's melting point and the solder enters a molten state, the assembly enters the reflow region of the process. For 63 Sn/37 Pb, a eutectic solder and the most common SMT alloy, reflow occurs at 183 degrees C." Phillip Zarrow, *Convection/Infrared and Convection Dominant Reflow Soldering of Fine Pitch SMT Devices*, Section 10.3.3 (1994). However, that same paper later describes the solder reflow process as taking the temperature of the solder above liquidus: "Most solder manufacturers recommend bringing the interconnection temperature approximately 15 to 25 degrees C above the alloy melting point to achieve full liquidus and assure good solder flow and aid fillet

formation." *Id.*

Memorandum of Plaintiff Vitronics Corporation in Opposition to Motion for Summary Judgment of Defendant Conceptronic Corporation and In Support of Plaintiff's Cross-Motion for Summary Judgment of Patent Validity and Infringement In its brief supporting its proposed construction of claim 1, both at the trial court level and here on appeal, Conceptronic similarly relied on a memorandum written by Vitronics which contains the following language: "Tin/lead solders commonly used by the electronic products industry have a 'liquidus' or 'reflow' temperature in the order of 183 degrees C, or about 361 degrees F." However, this phrase is in the background section of the memorandum and later in the same memorandum, Vitronics discussed the issue of infringement as being whether the temperature of the devices was maintained below "the temperatures of the leads at which the solder is reflowing."

Without indicating which evidence it relied upon, the district court simply ruled that solder reflow temperature meant 183 degrees C.

ANALYSIS

The Use of Intrinsic and Extrinsic Evidence in Claim Construction

A literal patent infringement analysis involves two steps: the proper construction of the asserted claim and a determination as to whether the accused method or product infringes the asserted claim as properly construed. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976, 34 USPQ2d 1321, 1326 (Fed. Cir. 1995) (in banc), *aff'd*, ___ U.S. ___, 116 S. Ct. 1384, 1393 [38 USPQ2d 1461] (1996); *Hormone Research Found., Inc. v. Genentech, Inc.*, 904 F.2d 1558, 1562, 15 USPQ2d 1039, 1042 (Fed. Cir. 1990), *cert. dismissed*, 499 U.S. 955 (1991). The first step, claim construction, is a matter of law, which we review *de novo*. *Markman*, 52 F.3d at 979, 34 USPQ2d at 1329. Claim construction is the only step in the infringement analysis at issue in this appeal. [FN4]

In determining the proper construction of a claim, the court has numerous sources that it may properly utilize for guidance. These sources have been detailed in our previous opinions, as discussed below, and include both intrinsic evidence (*e.g.*, the patent specification and file history) and extrinsic evidence (*e.g.*, expert testimony).

It is well-settled that, in interpreting an asserted

claim, the court should look first to the intrinsic evidence of record, *i.e.*, the patent itself, including the claims, the specification and, if in evidence, the prosecution history. *See Markman*, 52 F.3d at 979, 34 USPQ2d at 1329. Such intrinsic evidence is the most significant source of the legally operative meaning of disputed claim language.

First, we look to the words of the claims themselves, both asserted and nonasserted, to define the scope of the patented invention. *See Bell Communications Research, Inc. v. Vitalink Communications Corp.*, 55 F.3d 615, 620, 34 USPQ2d 1816, 1819 (Fed. Cir. 1995). Although words in a claim are generally given their ordinary and customary meaning, a patentee may choose to be his own lexicographer and use terms in a manner other than their ordinary meaning, as long as the special definition of the term is clearly stated in the patent specification or file history. *Hoechst Celanese Corp. v. BP Chems. Ltd.*, 78 F.3d 1575, 1578, 38 USPQ2d 1126, 1129 (Fed. Cir. 1996) ("A technical term used in a patent document is *1577 interpreted as having the meaning that it would be given by persons experienced in the field of the invention, unless it is apparent from the patent and the prosecution history that the inventor used the term with a different meaning.") (citations omitted); *Hormone*, 904 F.2d at 1563, 15 USPQ2d at 1043 ("It is a well-established axiom in patent law that a patentee is free to be his or her own lexicographer and thus may use terms in a manner contrary to or inconsistent with one or more of their ordinary meanings.") (citations omitted).

Thus, second, it is always necessary to review the specification to determine whether the inventor has used any terms in a manner inconsistent with their ordinary meaning. The specification acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication. *Markman*, 52 F.3d at 979, 34 USPQ2d at 1330. As we have repeatedly stated, "[c]laims must be read in view of the specification, of which they are a part." *Id.* at 979, 34 USPQ2d at 1329. The specification contains a written description of the invention which must be clear and complete enough to enable those of ordinary skill in the art to make and use it. Thus, the specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.

Third, the court may also consider the prosecution history of the patent, if in evidence. *Id.* at 980, 34 USPQ2d at 1330; *Graham v. John Deere*, 383 U.S. 1, 33, 148 USPQ 459, 473 (1965). This history contains

the complete record of all the proceedings before the Patent and Trademark Office, including any express representations made by the applicant regarding the scope of the claims. As such, the record before the Patent and Trademark Office is often of critical significance in determining the meaning of the claims. See *Markman*, 52 F.3d at 980, 34 USPQ2d at 1330; *Southwall Tech., Inc. v. Cardinal IG Co.*, 54 F.3d 1570, 1576, 34 USPQ2d 1673, 1676 (Fed. Cir. 1995) ("The prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution.") (citations omitted). Included within an analysis of the file history may be an examination of the prior art cited therein. *Autogiro Co. of America v. United States*, 384 F.2d 391, 399, 155 USPQ 697, 704 (Ct. Cl. 1967) ("In its broader use as source material, the prior art cited in the file wrapper gives clues as to what the claims do not cover.").

In most situations, an analysis of the intrinsic evidence alone will resolve any ambiguity in a disputed claim term. In such circumstances, it is improper to rely on extrinsic evidence. See, e.g., *Pall Corp. v. Micron Separations, Inc.*, 66 F.3d 1211, 1216, 36 USPQ2d 1225, 1228 (Fed. Cir. 1995) ("In construing the claims we look to the language of the claims, the specification, and the prosecution history. Extrinsic evidence may also be considered, if needed to assist in determining the meaning or scope of technical terms in the claims.") (citations omitted, emphasis added); *Hormone*, 904 F.2d at 1562, 15 USPQ2d at 1043 ("Claim interpretation involves a review of the specification, the prosecution history, the claims (including unasserted as well as asserted claims), and, if necessary, other extrinsic evidence, such as expert testimony.") (citations omitted, emphasis added). In those cases where the public record unambiguously describes the scope of the patented invention, reliance on any extrinsic evidence is improper. The claims, specification, and file history, rather than extrinsic evidence, constitute the public record of the patentee's claim, a record on which the public is entitled to rely. In other words, competitors are entitled to review the public record, apply the established rules of claim construction, ascertain the scope of the patentee's claimed invention and, thus, design around the claimed invention. See *Markman*, 52 F.3d at 978-79, 34 USPQ2d at 1329. Allowing the public record to be altered or changed by extrinsic evidence introduced at trial, such as expert testimony, would make this right meaningless. See *Southwall*, 54 F.3d at 1578, 34 USPQ2d at 1678 ("A patentee may not proffer an interpretation for the purposes of

litigation that would alter the indisputable public record consisting of the claims, the specification and the prosecution history, and treat the claims as a 'nose of wax.' " (quoting *Senmed, Inc. v. Richard-Allan Med. Indus., Inc.*, 888 F.2d 815, 819 n.8, 12 USPQ2d 1508, 1512 n.8 (Fed. Cir. 1989)). The same holds true whether it is the patentee or the alleged infringer who seeks to alter the scope of the claims.

The Proper Construction of the Claim Term "Solder Reflow Temperature"

[1] As can be readily seen from those portions of the specification set forth above, the meaning of the disputed term "solder reflow temperature" in claim 1 of the '502 patent is clear from a reading of the claim itself and the patent specification. The "peak reflow temperature" and "liquidus temperature" are clearly defined in the specification *1578 as having distinctly different meanings. Specifically, for the solders described in the specification, liquidus temperature is about 190 degrees C and the peak reflow temperature is about 210 degrees to 218 degrees C. Moreover, in the preferred embodiment described in the patent, the solder is heated to a temperature of 210 degrees C but the temperature of the devices is maintained at approximately 195 degrees C, i.e., below the peak reflow temperature (210 degrees C) but above the liquidus temperature (190 degrees C). Therefore, in order to be consistent with the specification and preferred embodiment described therein, claim 1 must be construed such that the term "solder reflow temperature" means the peak reflow temperature, rather than the liquidus temperature. Indeed, if "solder reflow temperature" were defined to mean liquidus temperature, a preferred (and indeed only) embodiment in the specification would not fall within the scope of the patent claim. Such an interpretation is rarely, if ever, correct and would require highly persuasive evidentiary support, which is wholly absent in this case. See *Modine Mfg. Co. v. United States Int'l Trade Comm'n*, 75 F.3d 1545, 1550, 37 USPQ2d 1609, 1612 (Fed. Cir. 1996); see also *Hoechst*, 78 F.3d at 1581, 38 USPQ2d at 1130 ("We share the district court's view that it is unlikely that an inventor would define the invention in a way that excluded the preferred embodiment, or that persons of skill in this field would read the specification in such a way."). *The District Court's Reliance on Extrinsic Evidence*

Since the claim, read in light of the patent specification, clearly uses the term "solder reflow temperature" to mean the peak reflow temperature,

rather than the liquidus temperature, that should have been the end of the trial court's analysis. [FN5] Only if there were still some genuine ambiguity in the claims, after consideration of all available intrinsic evidence, should the trial court have resorted to extrinsic evidence, such as expert testimony, in order to construe claim 1. Moreover, even if the judge permissibly decided to hear all the possible evidence before construing the claim, the expert testimony, which was inconsistent with the specification and file history, should have been accorded no weight. *Southwall*, 54 F.3d at 1578, 34 USPQ2d at 1678 ; *Markman*, 52 F.3d at 983, 34 USPQ2d at 1333 .

Here, the trial judge considered not only the specification, but also expert testimony and other extrinsic evidence, such as the paper written by the former Vitronics employee. No doubt there will be instances in which intrinsic evidence is insufficient to enable the court to determine the meaning of the asserted claims, and in those instances, extrinsic evidence, such as that relied on by the district court, may also properly be relied on to understand the technology and to construe the claims. *See Markman*, 52 F.3d at 979, 34 USPQ2d at 1329 . Extrinsic evidence is that evidence which is external to the patent and file history, such as expert testimony, inventor testimony, dictionaries, and technical treatises and articles. [FN6] *Id.* at 980, 34 USPQ2d at 1330 . However, as we have recently re-emphasized, extrinsic evidence in general, and expert testimony in particular, may be used only to help the court come to the proper understanding of the claims; it may not be used to vary or contradict the claim language. *Id.* at 981, 34 USPQ2d at 1331 . Nor may it contradict the import of other parts of the specification. Indeed, where the patent documents are unambiguous, expert testimony regarding the meaning of a claim is entitled to no weight. *Southwall*, 54 F.3d at 1578, 34 USPQ2d at 1678 . "Any other rule would be unfair to competitors who must be able to rely on the patent documents themselves, without consideration of expert opinion that then does not even exist, in ascertaining the scope of a patentee's right to exclude." *Id.* at 1578, 34 USPQ2d at 1678-79 . Nor may the inventor's subjective intent as to claim scope, when unexpressed in the patent documents, have any effect. Such testimony cannot guide the court to a proper interpretation when the patent documents themselves do so clearly.

In addition, a court in its discretion may admit and rely on prior art proffered by one of the parties, whether or not cited in the specification or the file

history. This prior art can often help to demonstrate how a disputed term is used by those skilled in the art. Such art may make it unnecessary to rely on expert testimony and may save much trial *1579 time. As compared to expert testimony, which often only indicates what a particular expert believes a term means, prior art references may also be more indicative of what all those skilled in the art generally believe a certain term means. Once again, however, reliance on such evidence is unnecessary, and indeed improper, when the disputed terms can be understood from a careful reading of the public record. *See Kearns v. Chrysler Corp.*, 32 F.3d 1541, 1547, 31 USPQ2d 1746, 1750 (Fed. Cir. 1994). Nor may it be used to vary claim terms from how they are defined, even implicitly, in the specification or file history.

Unfortunately, here the trial judge did use the extrinsic evidence to vary or contradict the manifest meaning of the claims. The trial judge was presented with expert testimony and other evidence that some of those skilled in the relevant art, including certain Vitronics employees, *sometimes* used the term "solder reflow temperature" and "liquidus temperature" interchangeably. He apparently relied on this testimony in reaching his conclusion that, as used in claim 1, solder reflow temperature meant 183 degrees C. [FN7] However, regardless of how those skilled in the art would interpret a term in other situations, where those of ordinary skill, on a reading of the patent documents, would conclude that the documents preclude the term being given the meaning propounded by the expert witnesses, we must give it the meaning indicated by the patentee in the patent claim, specification and file history. Thus, expert testimony tending to show that those skilled in the art would, in certain circumstances, understand "solder reflow temperature" to mean the solder liquidus temperature is entitled to no weight in light of the clear contrary meaning shown in the specification. *See Southwall*, 54 F.3d at 1578, 34 USPQ2d at 1678 ("Even if Southwall could show that 'sputter-deposited dielectric' has a meaning to one skilled in the art different from the definition in the '745 specification and file history, the definition in the patent documents controls the claim interpretation."). Because the specification clearly and unambiguously defined the disputed term in the claim, reliance on this extrinsic evidence was unnecessary and, hence, legally incorrect.

[2] Had the district court relied on the expert testimony and other extrinsic evidence solely to help it understand the underlying technology, we could not say the district court was in error. But testimony

on the *technology* is far different from other expert testimony, whether it be of an attorney, a technical expert, or the inventor, on the *proper construction* of a disputed claim term, relied on by the district court in this case. The latter kind of testimony may only be relied upon if the patent documents, taken as a whole, are insufficient to enable the court to construe disputed claim terms. Such instances will rarely, if ever, occur. Indeed, this case did not present such an instance. Even in those rare instances, prior art documents and dictionaries, although to a lesser extent, are more objective and reliable guides. Unlike expert testimony, these sources are accessible to the public in advance of litigation. They are to be preferred over opinion testimony, whether by an attorney or artisan in the field of technology to which the patent is directed. Indeed, opinion testimony on claim construction should be treated with the utmost caution, for it is no better than opinion testimony on the meaning of statutory terms. *See Markman*, 52 F.3d at 983, 34 USPQ2d at 1332-33 ("First, the testimony of Markman and his patent attorney on the proper construction of the claims is entitled to no deference. . . . This testimony about construction, however, amounts to no more than legal opinion -- it is precisely the process of construction that the court must undertake.").

Other Issues

Conceptronic further argues that, even if we were to reverse the district court's decision regarding the proper interpretation of the term "solder reflow temperature," the district court's ultimate conclusion of no infringement as a matter of law can still be affirmed on the alternative ground that Vitronics' evidence does not prove infringement because Vitronics failed to test the temperature of all of the various devices on the boards and because certain of the Vitronics tests demonstrated that many of the devices reached temperatures above the peak reflow temperature. Vitronics, of course, disputes these assertions and points to supporting documentation to the effect that the Conceptronic ovens do indeed maintain the temperature of the devices below peak reflow temperature. The trial court made no decision on this issue. Moreover, such a determination at this stage would require our weighing substantial *1580 but conflicting evidence, an impermissible exercise for an appellate court. Accordingly, we must remand.

CONCLUSION

For all the foregoing reasons, the judgment of non-

infringement as a matter of law is reversed and the case is remanded for further proceedings consistent with this opinion. *REVERSED AND REMANDED*

COSTS

Costs in favor of Vitronics.

FN1 A jury returned a verdict of non-infringement of the '301 patent. Vitronics does not appeal that verdict.

FN2 Whether the Conceptronic ovens utilize nonfocused infrared panel emitters is not before this court.

FN3 The specification of the '502 patent describes three exemplary types of solder which can be used in the solder reflow process -- 60/40 (Sn/Pb), 63/37 (Sn/Pb) and 66/2 (Sn/Pb/Ag) -- each of which, it indicates, has a liquidus temperature of about 190 degrees C and a peak reflow temperature of about 210 degrees to 218 degrees C. At trial, the parties appear to have discussed only 63/37 (Sn/Pb) solder, which has a liquidus temperature of 183 degrees C. However, the claims are not limited to that particular solder or a solder with that particular liquidus temperature.

FN4 No assertion was made that defendant infringed under the doctrine of equivalents.

FN5 The file history was apparently not put into evidence.

FN6 Although technical treatises and dictionaries fall within the category of extrinsic evidence, as they do not form a part of an integrated patent document, they are worthy of special note. Judges are free to consult such resources at any time in order to better understand the underlying technology and may also rely on dictionary definitions when construing claim terms, so long as the dictionary definition does not contradict any definition found in or ascertained by a reading of the patent documents.

FN7 Although the trial judge's reasoning does not appear in the record, he must have relied on the testimony presented by Conceptronic that "solder reflow temperature" and "liquidus temperature" were synonymous and the undisputed testimony that the liquidus temperature of 63/37 (Sn/Pb) solder is 183 degrees C.

C.A.Fed.

39 U.S.P.Q.2d 1573

END OF DOCUMENT

Appendix 3:

E.I du Pont de Nemours & Co. v. Phillips Petroleum Co., 849 F.2d 1430, 7 U.S.P.Q.2d 1129
(Fed. Cir. 1988), *cert. denied*, 488 U.S. 986 (1988).

H

E.I. du Pont de Nemours & Co.

v.

Phillips Petroleum Co.

Court of Appeals, Federal Circuit

Nos. 87-1259 and 87-1284

Decided June 15, 1988

United States Patents Quarterly Headnotes

PATENTS

[1] Patent construction -- Specifications and drawings
-- In general (§ 125.1101)

Patent construction -- Claims -- In general (§
125.1301)

Federal district court erred by incorporating two extraneous property limitations into claims, since, even though specification can be used to interpret what patentee meant by word or phrase in claim, limitation that is not required in specification should not be read from specification into claims.

PATENTS

[2] Patentability/Validity -- Anticipation -- Prior art (§
115.0703)

Patent infringement defendant must, in order to demonstrate that claims at issue were anticipated under 35 USC 102(g), demonstrate that copolymers it produced prior to invention possessed strength limitations of claims at issue, although defendant need not prove awareness by its researchers that those copolymers possessed those properties, and it can rely not only on its patent applications but also on notebook data.

PATENTS

[3] Patentability/Validity -- Anticipation -- Prior art (§
115.0703)

Patentability/Validity -- Obviousness -- Relevant prior art (§ 115.0903)

Federal district court erred by determining that prior work under 35 USC 102(g) can qualify as prior art under 35 USC 103 only if work is known to art or to patentee prior to making invention, since prior art under 35 USC 103 includes all work made prior to patentee's invention, regardless of when that work is made public or patent applications are filed, so long as work is found not to have been abandoned, suppressed, or concealed.

PATENTS

[4] Practice and procedure in U.S. Patent and Trademark Office -- Prosecution -- In general (§
110.0901)

Infringement -- Defenses -- Prosecution history estoppel (§ 120.1105)

Patent construction -- Claims -- Defining terms (§
125.1305)

Arguments made during prosecution history are relevant in determining meaning of terms at issue, and such arguments, as well as other aspects of prosecution history, must be examined to ascertain true meaning of what inventor intended to convey in claims, and use of prosecution history in such manner differs from prosecution history estoppel, which is applied as limitation upon doctrine of equivalents after claims have been properly interpreted.

REMEDIES

[5] Monetary -- Damages -- Patents -- Increased damages (§ 510.0507.07)

Orthokinetics Inc. v. Safety Travel Chairs Inc., 1 USPQ2d 1081, does not alter standard of proof, as set out in *Shatterproof Glass Corp. v. Libbey-Owens Ford Co.*, 225 USPQ 634, requiring that willful infringement be demonstrated by clear and convincing evidence.

REMEDIES

Particular patents -- Chemical -- Polymers

4,076,698, Lamb, et al., plasticized polymers of vinyl acetate, finding of failure to prove invalidity reversed for claims 2, 5, 10, and 14 and vacated for claims 1 and 12; cause remanded.

*1130 Appeal from the U.S. District Court for the District of Delaware, Latchum, J.; 2 USPQ2d 1545.

Plaintiff E.I. du Pont de Nemours & Co. brought patent infringement action against Phillips Petroleum Co., Phillips 66 Co., and Phillips Driscopipe Inc. From judgment holding that plaintiff failed to prove that infringement was willful, plaintiff appeals; defendants cross-appeal holding of infringement and failure to prove invalidity and unenforceability. Affirmed in part, reversed in part, vacated in part, and remanded.

John O. Tramontine, Fish & Neave, New York, N.Y., for plaintiff-appellant (Edward F. Mullowney, Glenn A. Ousterhout, and Thomas J. Vetter on the brief).

Philip S. Beck, Kirkland & Ellis, Chicago, Ill., Philip

C. Swain, of Kirkland & Ellis, Chicago, Ill., for defendants-cross-appellants (Harry J. Roper and George S. Bosy, Neuman, Williams, Anderson and Olson, Chicago, on the brief).

Before Bissell, circuit judge, and Miller, senior circuit judge [FN1]

Bissell, J.

E.I. du Pont de Nemours & Company ("Du Pont") appeals from a judgment of the United States District Court for the District of Delaware, *see E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 656 F.Supp. 1343, 2 USPQ2d 1545 (1987), that Du Pont failed to prove that the infringement of claims 1, 2, 5, 10, 12 and 14 of its U.S. Patent No. 4,076,698 ('698) was willful. Phillips Petroleum Company, Phillips 66 Company, and Phillips Driscopipe, Inc. (collectively, "Phillips"), the alleged infringers, cross-appeal from the district court's judgment that Du Pont proved infringement and that Phillips failed to prove invalidity under 35 U.S.C. §§102(g), 103 (1982 & Supp. III 1985), and unenforceability due to inequitable conduct. We affirm in part, reverse in part, vacate in part, and remand for further proceedings consistent with this opinion.

BACKGROUND

Polymers are large molecules formed when a smaller molecule, known as a monomer, joins chemically to itself in a repeating fashion. Forming a copolymer [FN1] involves joining different monomers. In Du Pont's invention, ethylene, a monomer, is copolymerized with a "higher alpha-olefin." This is a hydrocarbon having between 5 and 18 carbon atoms with a single double bond at one end. [FN2]

The copolymers of the six claims at issue are in part defined by their properties. Consider, for example, claim 5:

5. An interpolymer of ethylene and a higher olefinic hydrocarbon having 5 to 10 carbon atoms per molecule, said higher olefinic hydrocarbon having one terminal - $\text{CH}=\text{CH}_2$ per molecule and no other olefinic unsaturation, said interpolymer being further characterized in that it has an X-ray crystallinity in the range of 40 to 70%, a melt index in the range of 0.3 to 20, a density in the range of 0.9 to 0.95 and said interpolymer being further characterized in that its density is not less than 0.93 unless the content of

said higher olefinic hydrocarbon in the interpolymer is at least 3% by weight.

The remaining claims are similar, though claim 1 requires a certain "Elmendorf tear strength," and claim 12 requires a specified hoop stress. All six claims are reproduced in the Appendix below.

Du Pont filed its original patent application on March 1, 1956, and a continuation-in-part (CIP) application, S.N. 632,416, on January 4, 1957. The '698 patent issued from the CIP application on February 28, 1978, to Anderson and Stamatoff. The delay in issuance was partially due to an interference proceeding before the Board of Patent Interferences at the United States Patent & Trademark Office (PTO). As originally filed, the application contained both product and process claims. However, the process claims were cancelled following the interference proceeding, leaving 15 product claims in the '698 patent.

In 1981, Du Pont filed the infringement suit now on appeal. Phillips in its Answer and Counterclaim alleged invalidity, unenforceability, and noninfringement. In a bifurcated trial, the court tried the liability issues from July 21, 1986 through August 18, 1986. During the district court proceedings, the *1131 PTO conducted a merged reissue/reexamination proceeding of the '698 patent that culminated, on May 12, 1986, with a final rejection of all the claims. On June 11, 1986, Du Pont appealed that rejection to the PTO Board of Patent Appeals and Interferences but that appeal was stayed as of August 6, 1986.

Included in the prior art Phillips relied on at trial were the three items relied on in the appeal: (1) the 1955 work of Witt and Leatherman -- researchers for Phillips; (2) Vandenberg U.S. Patent No. 3,058,963; and (3) Brown U.S. Patent No. 2,728,752.

At trial, Du Pont conceded that Phillips, through the work of Witt and Leatherman, made ethylene/higher alpha-olefin copolymers in the United States before the date of the claimed invention. However, Du Pont claimed that its copolymers could be distinguished from those of Phillips because of two properties disclosed in its patent specification but not expressly written into the claims. The district court accepted Du Pont's argument, incorporated those two properties as limitations into the six claims at issue, and determined that the claims were not invalid, not unenforceable, and infringed but not willfully.

ISSUES

1. Whether the district court erred in incorporating two extraneous property limitations into the claims.
2. Whether the district court erred in holding that the claims were not invalid under 35 U.S.C. §102(g).
3. Whether the district court erred in holding that the claims were not invalid under 35 U.S.C. §103.
4. Whether the district court erred in holding that the patent was not unenforceable.
5. Whether the district court clearly erred in finding that the claims were infringed.
6. Whether the district court applied the incorrect standard of proof regarding willful infringement.

OPINION

I. Validity

A. Claim Interpretation

The district court believed that the essence of Du Pont's invention is that its copolymers, when compared with "free-radical polyethylene, with linear polyethylene and with comparable copolymers of ethylene . . . and the lower alpha-olefins," possess superior (1) environmental stress crack resistance and (2) impact strength. *Du Pont*, 656 F.Supp. at 1350, 2 USPQ2d at 1547. The district court interpreted the claims as including those two properties. In doing so, it erred.

The significance of claims in defining an invention was clearly expressed by our predecessor court in *Autogiro Co. of America v. United States*, 384 F.2d 391, 395-96, 155 USPQ 697, 701 (Ct. Cl. 1967):

The claims of the patent provide the concise formal definition of the invention. They are the numbered paragraphs which 'particularly [point] out and distinctly [claim] the subject matter which the applicant regards as his invention.' 35 U.S.C. §112. It is to these wordings that one must look to determine whether there has been infringement. [Footnote omitted.] Courts can neither broaden nor narrow the claims to give the patentee something different than what he has set forth. [Footnote omitted.] No matter how great the temptations of fairness or policy making, courts do not rework claims. They only interpret them.

In accordance with that instruction, this court has consistently adhered to the proposition that courts "cannot alter what the patentee has chosen to claim as his invention." *SSIH Equipment S.A. v. U.S. Int'l Trade Comm*, 718 F.2d 365, 378, 218 USPQ 678, 689 (Fed. Cir. 1983) (citing *Autogiro*); see also *Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 867, 228 USPQ 90, 93 (Fed. Cir. 1985) ("Generally, particular limitations or embodiments appearing in the specification will not be read into the claims."). Indeed, neither *Du Pont* nor the district court cites any case of this court reading extraneous limitations into a claim.

It is entirely proper to use the specification to interpret what the Patentee meant by a word or phrase in the claim. See, e.g., *Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 867, 228 USPQ 90, 93 (Fed. Cir. 1985). But this is not to be confused with adding an extraneous limitation appearing in the specification, which is improper. By "extraneous," we mean a limitation read into a claim from the specification wholly apart from any need to interpret what the patentee meant by particular words or phrases in the claim. "Where a specification does not require a limitation, that limitation should not be read from the specification into the claims." *Specialty Composites v. Cabot Corp.*, Nos. 87-1456, -1457, slip op. at 11 [6 USPQ2d 1601 at 1605] (Fed. Cir. April 27, 1988 (emphasis in original), citing *Lemelson v. United States*, 752 F.2d 1538, 1551-52, 224 USPQ 526, 534 (Fed. Cir. 1985).

Although the district court cited as support *United States v. Adams*, 383 U.S. 39, *1132 148 USPQ 470 (1966), *Adams* does not support reading into the claims extraneous limitations from the specification. *Adams* involved claims to a battery comprising a combination of various claimed elements, none of which was water. *Adams* argued that the battery, unlike prior art batteries, could be successfully and unexpectedly operated with water. Though using water was not expressly included in the claims, that unexpected feature was relevant to the Court's decision on nonobviousness. See, e.g., *Graham v. John Deere*, 383 U.S. 1, 17-18, 145 USPQ 459, 467 (1966) (objective indicia are probative of nonobviousness).

It was not necessary for the Court in *Adams* to read, and the Court did not read, a "water" limitation into the claims. The Court discussed the water feature only when considering rebuttal of defendant's argument of obviousness. Properly interpreted, *Adams* does not deviate from this language in a Supreme Court precedent that *Adams* refers to for authority:

[W]e know of no principle of law which would authorize us to read into a claim an element which is not present, for the purpose of making out a case of novelty or infringement. The difficulty is that if we once begin to include elements not mentioned in the claim in order to limit such claim and avoid a defense or anticipation, we should never know where to stop.

McCarty v. Lehigh Valley R. Co., 160 U.S. 110, 116 (1895) (cited in *Adams*, 383 U.S. at 48-49, 148 USPQ at 482).

Du Pont contends that *Decca Limited v. United States*, 420 F.2d 1010, 164 USPQ 345 (Ct. Cl. 1970), *cert. denied*, 400 U.S. 865 [167 USPQ 321] (1970), supports the district court decision. It is mistaken. The claims at issue in *Decca* were written in "means plus function" format, which are subject to the last paragraph of 35 U.S.C. §112. Hence, resort to the specification in *Decca* was necessary not only pursuant to the normal rule of resorting to the specification to interpret what the patentee meant by claim language, but also, pursuant to statute.

[1] Although language in *Decca* and other Court of Claims decisions may have given the perception that claims are to be "saved" from invalidity by reading extraneous limitations into them, *see, e.g., SSIH Equipment S.A. v. USITC*, 718 F.2d 365, 385, 218 USPQ 678, 695 (Fed. Cir. 1983) (Smith, J., concurring in part, dissenting in part), this court's consistent approach in interpreting claims, and in rejecting resort to extraneous limitations from the specification, should have negated that perception by now. *See Sjolund v. Musland, Norsol, Inc. and Wink Corp.*, No. 87-1496, slip op. at 23 [6 USPQ2d 2020, 2027-2027] (Fed. Cir. June 1, 1988) ("limitations from the specification are not to be read into the claims"). Thus, the district court was wrong as a matter of law in reading into the claims at issue the two extraneous property limitations mentioned above. The remainder of this opinion, and the proceedings on remand below, shall treat the claims as not containing those limitations.

B. Novelty -- 35 U.S.C. §102(g)

The novelty issue relates to 35 U.S.C. §102(g) which states that a person is entitled to a patent unless "before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it."

The claims in this case fall into two groups. One group -- claims 2, 5, 10 and 14 -- contains limitations pertaining only to density, percent crystallinity, melt indices, percent monomer, and type of monomer. Independent claim 5, reproduced above, is representative. Du Pont has conceded that the Witt and Leatherman copolymers of Phillips made in this country before the Du Pont invention, satisfied those limitations. [FN3] Because it is conceded that the copolymers of claims 2, 5, 10 and 14 are anticipated by the prior work of Phillips, we reverse the district court's determination with respect to these claims, and hold these claims invalid.

[2] The second group of claims -- claims 1 and 12 -- must be addressed on remand. Those two claims include a limitation not *1133 present in the other four claims and not conceded by Du Pont to be present in the Witt and Leatherman copolymers. Claim 1 includes this limitation: "when in the form of a film, an Elmendorf tear strength in the range of 150 to 400 grams per mil." Claim 12, which claims the copolymer in the form of pipe, recites a limitation to impact strength in terms of hoop stress. To find anticipation of claims 1 and 12, the district court must determine that Phillips met its burden of proving by clear and convincing evidence that the copolymers it made prior to Du Pont's invention possessed those properties. *See American Hoist & Derrick Co. v. Sowa & Sons, Inc.*, 725 F.2d 1350, 1360, 220 USPQ 763, 771 (Fed. Cir.), *cert. denied*, 469 U.S. 821 [224 USPQ 520] (1984).

Phillips asserts, citing *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985), that the strength limitations of claims 1 and 12 are merely property limitations that cannot serve to distinguish the claims from the Witt and Leatherman copolymers. In *Titanium*, the claims covered, for example, a "titanium based alloy consisting essentially by weight of about 0.6% to 0.9% nickel, 0.2% to 0.4% molybdenum, up to 0.2% those per centages, and the court stated:

Congress has not seen fit to permit the patenting of an old alloy, known to others through a printed publication, by one who has discovered its corrosion resistance or other useful properties, or has found out to what extent one can modify the composition of the alloy without losing such properties.

Id., 778 F.2d at 782, 227 USPQ at 778.

Titanium, however, does not mean that property limitations can never have meaning in a claim. On occasion, particularly with polymers, structure alone may be inadequate to define the invention, making it appropriate to define the invention in part by property limitations. As the district court here recognized in assessing the issues under 35 U.S.C. §112, "if the claims, read in light of the specification, reasonably apprise those skilled in the art both of the utilization and scope of the invention, and if the language is as precise as the subject matter permits, the courts can demand no more." *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1385, 231 USPQ 81, 94 (Fed. Cir. 1986), cert. denied, 107 S.Ct. 1606 (1987). [FN4]

Here, the district court found that "[t]he ethylene-higher alpha-olefin copolymers of the invention are characterized by several parameters so that they can be distinguished by external tests from linear ethylene homopolymers and from linear ethylene copolymers that are rubber-like." *Du Pont*, 656 F.Supp. at 1350, 2 USPQ2d at 1547. The district court concluded that those parameters "are measurements of comonomer content, density, and percent crystallinity." *Id.* However, the district court implicitly used additional parameters to help define the claimed invention because it read into the claims the two property limitations discussed above in Part I, A, and considered the Elmendorf strength of claim 1 and hoop stress of claim 12 in determining validity and infringement.

Furthermore, *Du Pont's* expert, Dr. Beasley, testified that "if process parameters are not identical in two polymerizations intended to make ethylene copolymers using the same monomers, the resultant copolymer will probably have different properties." The district court accepted that and noted: "the court now assumes that Phillips is not urging the theory initially espoused by Dr. Price that compounds that have the same general chemical structure will have the same properties regardless of how they are made." Thus, the district court found the interpolymer actually produced depends in part on the process used to prepare it. *Du Pont*, 656 F.Supp. at 1365, 2 USPQ2d at 1560.

It is clear, therefore, that the district court correctly regarded the claimed interpolymers as compositions that can be permissibly defined in terms of structure and properties. Thus, the issue is not, as in *Titanium*, whether one can get a patent on discovering a new property of an old composition of matter. The issue is whether the claimed copolymer, as defined in part by

various property parameters, is new. In *Titanium*, once the alloy disclosed in the prior art reference was determined to possess the structural limitations of the claim, the burden shifted to the applicants to show that the alloy disclosed in the reference did not possess the claimed property. Here, however, *1134 Phillips has not shown that their interpolymers of ethylene and higher alpha olefins possess the property limitations set forth in the claims.

As the one challenging validity, Phillips must prove on remand that the strength limitations of claims 1 and 12 are possessed by the Witt and Leatherman products. ~~See *Tyler Refrigeration v. Kysor Industrial Corp.*, 777 F.2d 687, 689, 227 USPQ 845, 846-47 (Fed. Cir. 1985) (identity of invention is question of fact and challenger must show that each element of claim is found in a prior patent or publication, either expressly or under principles of inherency). In meeting that burden, Phillips need not prove awareness by Witt and Leatherman that their products possessed the properties. Also, Phillips is entitled to rely not only on the Witt and Leatherman patent application and its corresponding foreign patent applications, but also on the notebook data presented by Phillips. The district court did not allow Phillips to use that data regarding the two improper claim limitations discussed above in Part I, A, because it determined that the data on stress crack resistance was "abandoned, suppressed, or concealed." *Du Pont*, 656 F.Supp. at 1355-56, 2 USPQ2d at 1551-52. That was legally incorrect if 35 U.S.C. §102(g), as opposed to the Federal Rules of Evidence, was used as the basis of excluding the data. The inquiry under §102(g) allows Phillips to use any relevant data to prove its defense unless the information is otherwise untimely produced.~~

C. Nonobviousness

As the district court recognized, determining nonobviousness is a legal question based on factual underpinnings. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 567 (1966); *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1566-68, 1 USPQ2d 1593, 1596-97 (Fed. Cir.), cert. denied, 107 S.Ct. 2187 (1987). Changing the definition of the claims used by the district court by eliminating the two limitations it improperly read into the claims may affect a number of those factual inquiries and the legal conclusion itself. Because of that, we deem it appropriate for the district court to reassess the nonobviousness of claims 1 and 12 as properly defined. We can review that legal assessment, in any subsequent appeal, for error or the underlying fact

findings for clear error.

However, because the district court applied an incorrect test in excluding the work of Witt and Leatherman as prior art for §103 purposes, we give guidance to the court on one aspect of one of the factual underpinnings of nonobviousness, the "scope and content of the prior art." *Id.* Specifically, we now address when §102(g) prior work can be used as §103 prior art.

[3] The district court in excluding the work of Witt and Leatherman applied a test derived from *In re Clemens*, 622 F.2d 1029, 1039-40, 206 USPQ 289, 299 (CCPA 1980): the work of another under § 102(g) is prior art under §103 only when that work is known to the art or to the patentee before he made the invention. *See, e.g., Kayton on Patents*, 5-28 (2d ed. 1983). Applying that test, the district court held that Phillips' prior work was not usable in a § 103 context "[b]ecause Phillips' work was kept secret and was unknown to both the du Pont researchers and the art." [FN5] *Du Pont*, 656 F.Supp. at 1363, 2 USPQ2d at 1558. The district court also relied on *Kimberly-Clark Corp. v. Johnson & Johnson*, 745 F.2d 1437, 223 USPQ 603 (Fed. Cir. 1984), and Phillips contends that *Kimberly-Clark* eliminated the test of *Clemens*. We agree with Phillips.

Kimberly-Clark distinguished as dictum the *Clemens* requirement of applicant's personal knowledge because "§102(g) contains no personal knowledge requirement." 745 F.2d at 1445, 223 USPQ at 607. Nor does §102(g) contain a "known to the art" requirement apart from the requirement of no abandonment, suppression or concealment. Hence, the alternative *Clemens* requirement that the prior work be "known to the art" is also implicitly dismissed as dictum. That implication is further supported by the conclusion in *Kimberly-Clark* that certain prior work at issue, solely because it satisfied §102(g) (i.e., it was reduced to practice and had not been abandoned, suppressed or concealed), could be used for §103 purposes. *Id.*, 745 F.2d at 1444, 223 USPQ at 606; *see also Hybritech Inc. v. Monoclonal Antibodies*, *1135 *Inc.*, 802 F.2d 1367, 1371 n.1, 231 USPQ 81, 84 n.1 (Fed. Cir. 1986) (§102(g) prior art can be used for § 103).

The concurring opinion in *In re Bass*, 474 F.2d 1276, 177 USPQ 178 (CCPA 1973), properly characterized the proposition for which *Kimberly-Clark* stands by stating:

[t]he term 'prior art' as it is used in 35 U.S.C. §103 should include all inventions which were made in this country before an applicant or patentee made his invention, regardless of when those inventions are made public or patent applications on them are filed, so long as those inventions are found not to have been abandoned, suppressed, or concealed.

474 F.2d at 1292, 177 USPQ at 190. Moreover, although *Kimberly-Clark* concluded there was no abandonment, suppression, or concealment because of a filed patent application that issued, *Kimberly-Clark* does not require that a patent application be filed or a patent be issued before §102(g) prior work can qualify as §103 prior art.

Certainly the court in *Kimberly-Clark* was concerned about "secret prior art." 745 F.2d at 1446, 223 USPQ at 607. Nevertheless the requirement of proving no abandonment, suppression, or concealment does mollify somewhat the "secret" nature of §102(g) prior art. Despite its concern over "secret prior art," the court in *Kimberly-Clark* allowed prior work to be used as prior art in a §103 context so long as it satisfied the requirements of §102(g). As stated in the concurring opinion in *Kimberly-Clark*, the majority opinion "has extended the scope of what constitutes the prior invention of another, under §102(g), to encompass the prior work of another which has been reduced to practice." 745 F.2d at 1460, 223 USPQ at 619 (footnote omitted). [FN6]

II. Infringement

As indicated above, we reverse the district court's claim interpretation with respect to the two property limitations "read into" the claims and, with respect to the judgment that Phillips has not proven invalidity, we reverse for claims 2, 5, 10 and 14 and vacate for claims 1 and 12. Thus, the judgment of infringement must also be vacated. However, on the infringement issue it is appropriate for judicial economy to review Phillips' challenge to the district court's interpretation of the density and crystallinity parameters appearing in claims 1 and 12.

A. Density

Phillips urges that the "0.95" limitation appearing in the claims means "0.950" and that the district court incorrectly interpreted "0.95" as meaning between 0.9451 and 0.9550. Consequently, Phillips urges that the district court incorrectly found that Phillips' products, having a density between 0.9501 and 0.9550,

literally infringed the claims at issue.

[4] Phillips urges that during the prosecution history Du Pont made arguments on the meaning of the density that are contrary to the district court's interpretation. We agree with Phillips that arguments made during the prosecution history are relevant in determining the meaning of the terms at issue. Those arguments, and other aspects of the prosecution history, as well as the specification and other claims, must be examined to ascertain the true meaning of what the inventor intended to convey in the claims.

Loctite Corp. v. Ultraseal Ltd., 781 F.2d 861, 867, 228 USPQ 90, 93-94 (1985). Using the prosecution history in that manner is different from prosecution history estoppel, which is applied as a limitation upon the doctrine of equivalents after the claims have been properly interpreted. *Id.*, 781 F.2d at 870, 228 USPQ at 96. The district court here incorrectly assumed that prosecution history can be used only in the latter regard. After noting that "Phillips advanced five prosecution history estoppel arguments related to the claim parameters of density, crystallinity and comonomer content in an effort to restrict the scope of the asserted claims," *Du Pont*, 656 F.Supp. at 1388, 2 USPQ2d at 1579, the court concluded that none of the arguments "involve the classic situation for estoppel, such as if Du Pont had narrowed a claim by amendment and now sought to require what was given up by resort to the doctrine of equivalents." *Id.*

In interpreting "0.95" the district court referred to the specification and to "customary scientific notations." *Id.* at 1385, 2 USPQ2d at 1577. However, during prosecution Du Pont argued that a density between 0.950 and 0.955 was not within the scope of its claims. This position is inconsistent with the claim interpretation Du Pont now urges. Specifically, the examiner rejected Du Pont's pending claims, stating in part: "Since *1136 the polymers disclosed by the [Field and Feller (F&F)] references have densities *within the scope* of applicants' claims . . . it is not seen how the instantly claimed copolymers differ from those of the references." (Emphasis added.) In response, Du Pont argued:

[W]herever given in Field and Feller, the densities of the 'normally solid hydrocarbon material' polymerization product, where some olefinic material, other than propylene, was included in the reaction mixture with ethylene, were in the range of linear polyethylene homopolymers (0.954 - 0.97) rather than in the range (0.9 to 0.95) of the novel

branched polyethylenes (ethylene 1-olefin copolymers) claimed by applicants.

The examiner posited in the rejection that the F&F densities, including one of 0.9547, were within the scope of Du Pont's claims (0.9 to 0.95), but that was contested by Du Pont.

Du Pont argues that the examiner, in subsequently withdrawing his rejection, placed no reliance on the 0.95 density recitation to distinguish F&F. That misses the point.

Regardless of the examiner's motives, arguments made during prosecution shed light on what the applicant meant by its various terms. Not only did Du Pont argue that an F&F density of 0.954 fell outside the scope of its claims but also, regarding the next highest F&F density, 0.9557, Du Pont stated that it was "far above" any densities of applicant's unique, branched polyethylenes. Du Pont also stated that the F&F density of 0.9585 had a "quite high density."

In light of that prosecution history, as well as other factors such as the patent specification, the district court should ascertain on remand the meaning of the density parameter. If the court determines that the parameter has changed, it should reassess infringement. We caution, however, that even if the district court decides in light of the prosecution history to redefine the density as 0.950, and accordingly, changes its finding of literal infringement for those products of Phillips having a density between 0.9501 and 0.9550, the issue of infringement under the doctrine of equivalents must be addressed by the court. As indicated in *Loctite Corp. v. Ultraseal Ltd.*, 781 F.2d 861, 871, 228 USPQ 90, 96 (Fed. Cir. 1985), merely because certain prosecution history is used to define the claims more narrowly, there still may be--even in light of that same prosecution history--an appropriate range of equivalents under the doctrine of equivalents.

B. Crystallinity

On crystallinity, Phillips urges that the 70% maximum limitation means "70%," not "70% +/- a variance of 10%-20%" as interpreted by the district court. As with density, the district court seemed to find prosecution history relevant only in an estoppel context. That, again, is incorrect. With Phillips' interpretation, products over 70% would not literally infringe; with the district court's interpretation, some were held to infringe literally.

The district court seemed to ignore arguments made during the reissue/reexamination proceeding that prior art polymers including those with crystallinity of 38%, 32%, and 38% were "outside the scope of appellant's claims." Statements made during reissue are relevant prosecution history when interpreting claims. *See, e.g., Howes v. Medical Components*, 814 F.2d 638, 645, 2 USPQ2d 1271, 1275 (Fed. Cir. 1987); *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 452, 227 USPQ 293, 296 (Fed. Cir. 1985).

It is relevant to the claim interpretation here that Du Pont urged that something ~~2% off the claimed lower~~ limit of 40% is not in the range, yet later argued for a variance of 10%-20% off the upper limit. As with density, therefore, we instruct the district court judge on remand to reassess the meaning of the crystallinity parameter. Again as with density, however, even if the district court redefines the parameter as "70% without variance," the issue of infringement under the doctrine of equivalents must still be addressed.

C. Remand Instructions

On remand, the district court should ascertain the meaning of a density of "0.95" and a crystallinity of "70%." If it means "0.950" density or "70% without variance" crystallinity, infringement will have to be reassessed under the doctrine of equivalents for those Phillips products having a density over 0.950 or a crystallinity over 70%. However, the instruction to reassess the definitions of "0.95" and "70%" does not affect the infringement determination unchallenged on appeal for those infringing Phillips products that have a density below 0.950 and a crystallinity less than 70%.

III. Inequitable Conduct

Phillips alleges as inequitable conduct (1) Du Pont's failure to inform the PTO about the alleged status of Du Pont's Rule 131 affidavit, and (2) Du Pont's improper selection of data. The district court rejected those *1137 arguments apparently because it found that Phillips failed to prove by clear and convincing evidence that the alleged misrepresentations were material. Phillips has not shown us that those findings were clearly erroneous, *J.P. Stevens & Co. v. Lex Tex Ltd.*, 747 F.2d 1553, 1562, 223 USPQ 1089, 1094 (Fed. Cir. 1984), *cert. denied*, 474 U.S. 822 (1985), nor that the conclusions of no inequitable conduct were otherwise incorrect. In reaching that conclusion in the context of this case, we are reminded of this admonition of *Kimberly-Clark v. Johnson & Johnson*,

745 F.2d 1437, 1454, 223 USPQ 603, 614 (Fed. Cir. 1984): "Fraud in the PTO' has been overplayed, is appearing in nearly every patent suit, and is cluttering up the patent system."

IV. Willfulness

The district court decided that Du Pont did not prove willfulness by clear and convincing evidence, although it stated that Du Pont would have proven infringement if the standard of proof had been a preponderance of the evidence. Du Pont argues on appeal that willful infringement need only be proved by a preponderance of the evidence. *Du Pont*, 656 F.Supp. at 1394, 2 USPQ2d at 1584. That is legally incorrect. As this court stated in *Shatterproof Glass Corp. v. Libbey-Owens Ford Co.*, 758 F.2d 613, 628, 225 USPQ 634, 644 (Fed. Cir. 1985): "[t]he jurisprudence . . . uniformly requires clear and convincing evidence in support of increased damages."

Du Pont cites *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1569, 1583, 1 USPQ2d 1081, 1083, 1094 (Fed. Cir. 1986). There the court did not specifically focus on the proper standard to apply, but, when discussing the procedural history at the district court it stated generally that the "54 jointly prepared questions . . . [submitted to the jury] . . . recognized the appropriate burdens to be met by each of the parties as well as the corresponding standard of proof with respect to each issue." *Id.* at 1569, 1 USPQ2d at 1083. One of the standards, not discussed in the opinion, is revealed by question 24, contained in the APPENDIX to the opinion: "Do you find that Orthokinetics has proved by a preponderance of the evidence that the infringement of the [867] patent by any of the following defendants was willful?"

[5] Obliquely, therefore, *Orthokinetics* might support Du Pont's position. However, *Orthokinetics* never focused on the issue, and we conclude that *Orthokinetics* never intended to change the proper test stated in *Shatterproof*.

DECISION

In view of the foregoing: (1) the district court's claim interpretation is (a) reversed insofar as it has "read into" the claim two extraneous property limitations, and (b) vacated insofar as it has interpreted a density limitation of "0.95" to mean "0.9451 - 0.9550" and a crystallinity limitation of "70%" to mean "70% +/- 10-20%"; (2) the district court's judgment that Phillips did not prove invalidity under 35 U.S.C. §102(g) is

reversed for claims 2, 5, 10, and 14 and vacated for claims 1 and 12; (3) the district court's judgment that Phillips did not prove invalidity under 35 U.S.C. §103 is vacated for all claims; (4) the district court's judgment that Phillips did not prove unenforceability is affirmed; (5) the district court's judgment that Du Pont proved infringement is vacated; and (6) the district court's judgment that Du Pont did not prove willful infringement is affirmed. This case is remanded for further proceedings consistent with this opinion.

COSTS

Costs are awarded to Phillips.

*AFFIRMED IN PART, REVERSED IN PART,
VACATED IN PART AND REMANDED*

APPENDIX

1. An interpolymer composed of interpolymerized comonomers consisting essentially of ethylene and at least one normal aliphatic mono-alpha-olefinic hydrocarbon containing from 5 to 10 carbon atoms per molecule, the proportion of said monoolefinic hydrocarbon being from 3 to 7% of the weight of the interpolymer, said interpolymer having a melt index within the range of 0.3 to 20, and, when in the form of a film, an Elmendorf tear strength in the range of 150 to 400 grams per mil, and a density of 0.93 to 0.94.

2. An interpolymer of ethylene and from 1% to 20% by weight of a higher olefinic hydrocarbon having 5 to 18 carbon atoms per molecule, said higher olefinic hydrocarbon having no non-aromatic unsaturation other than one terminal $-\text{CH}=\text{CH}_{\text{sub}2}$ per molecule, said interpolymer having essentially no other copolymerized components, the proportion of the interpolymerized ethylene component therein being not less than 80% nor more than 90% by weight, the percentage crystallinity of the interpolymer being such that the density ranges from 0.95 at 1% interpolymerized higher olefinic hydrocarbon *1138 down to 0.9 at 20% interpolymerized higher olefinic hydrocarbon.

5. An interpolymer of ethylene and a higher olefinic hydrocarbon having 5 to 10 carbon atoms per molecule, said higher olefinic hydrocarbon having one terminal $-\text{CH}=\text{CH}_{\text{sub}2}$ per molecule and no other olefinic unsaturation, said interpolymer being further characterized in that it has an X-ray crystallinity in the range of 40 to 70%, a melt index in the range of 0.3 to 20, a density in the range of 0.9 to 0.95 and said interpolymer being further characterized in that its

density is not less than 0.93 unless the content of said higher olefinic hydrocarbon in the interpolymer is at least 3% by weight.

10. Composition of claim 5 in the form of a film.

12. Composition of claim 5 in the form of pipe which is further characterized by withstanding 3000 hours at hoop stress of 750 psi and a temperature of 60 degreesC.

14. A composition of claim 5 having a density in the range of 0.910 to 0.945 and a melt index in the range of 0.3 to 2.1.

FN1 Circuit Judge Archer heard oral argument in these appeals but subsequently recused himself, taking no position in the decision of this case.

FN1 I.e., "interpolymer."

FN2 In comparison, a "lower alpha-olefin" would have 3-4 carbon atoms.

FN3 At trial, Du Pont conceded as follows:

DuPont judicially admits that before the date of DuPont's invention of the patent in suit, Gerald T. Leatherman and Donald R. Witt, researchers at Phillips, made in the United States copolymers of ethylene with propylene, ethylene with 1-butene, ethylene with 1-pentene and ethylene with 1-hexene. That those ethylene with 1-pentene copolymers had comonomer-type, density, melt index, percent crystallinity and weight percent comonomer content falling within the ranges expressly called for by the claims asserted against Phillips in this action.

That those ethylene-1-hexene copolymers had comonomer-type, density, percent crystallinity and weight percent comonomer content falling within the ranges expressly called for by the claims asserted against Phillips in this action and melt indices of 0.19 and 0.27.

DuPont will not attempt to prove in this action that the invention of the patent in suit was made by DuPont before the dates that those ethylene-1-pentene copolymers and ethylene-1-hexene copolymers were made by Gerald T. Leatherman and Donald R. Witt.

FN4 Compare *Seattle Box, Inc. v. Industrial Crating & Packing, Inc.*, 731 F.2d 818, 826, 221 USPQ 568, 574 (Fed. Cir. 1984) (the test for adequacy under §112

P2 is "whether one of ordinary skill in the art would understand what is claimed when the claim is read in light of the specification").

FN5 Because work is "secret" does not necessarily mean that it has been "abandoned, suppressed or concealed." The latter determination depends on the overall facts of each case. For example, the filing of a United States patent application, as Phillips did here, maintains the secrecy of work, but is a factor cutting against abandonment, suppression or concealment. In any event, Du Pont conceded that the prior Phillips work has not been abandoned, suppressed or concealed; e.g., it admits in its reply brief that the Witt and Leatherman work is "available as a defense of prior invention under Section 102(g)." In that regard, the Phillips' work was the subject of foreign patent applications, speeches at various conferences, and papers presented at American Chemical Society

meetings.

FN6 The effect of using §102(g) for §103 purposes is limited by the Patent Law Amendments Act of 1984. Pursuant thereto, this sentence was added to 35 U.S.C. §103: "Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person."

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7 U.S.P.Q.2d 1129

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Appendix 4:

In re Herrick, 344 F.2d 713, 145 U.S.P.Q. 400 (C.C.P.A. 1965).

In re HERRICK AND BOCK

Court of Customs and Patent Appeals

Appl. No. 7396

Decided May 6, 1965

United States Patents Quarterly Headnotes

PATENTS

[1] Court of Customs and Patent Appeals Dismissing and remanding (§ 28.15)
Pleading and practice in Patent Office--Rejections (§ 54.7)

Rejections defeat intent and purpose of 35 U.S.C. 132 where their number is indefinite due to use of "and," "or," "and/or," and "any"; since situation does not permit rational isolation and determination of legal issues which may be present, court remands to Board; it is not satisfactory for court to choose one individual rejection for each claim and turn entire appeal on correctness of those rejections or for court to work its way through each rejection in the hope of finding one it can sustain; issues must be framed in Patent Office so that court can determine with certainty the areas of court's authority under 35 U.S.C. 144; court declines to substitute speculation for the greater certainty which should come from Patent Office in a more definite statement of grounds of rejections; to the extent that references are truly cumulative, examiner or Board can so indicate; if all or most of references are necessary to meet claims, rejection can be made specific as to particular references; it is not sufficient justification for improper rejections that claimed subject matter is complex; since there is no rejection for indefiniteness, court can only assume that claims so define subject matter that statutory ground of rejection could be made.

PATENTS

Particular patents--Phenol

Herrick and Bock, Polymethylol Phenol and Phenolic Resins, appeal from rejection of claims 1 to 6 and 8 of application remanded to Patent Office.

***400** Appeal from Board of Appeals of the Patent Office.

Application for patent of Franklin W. Herrick and Louis H. Bock, Serial No. 625,209, filed Nov. 30, 1956; Patent Office Group 140. From decision

rejecting claims 1 to 6 and 8, applicants appeal. Appeal remanded.

W. BROWN MORTON and CHARLES N. SHANE, JR., both of New York, N. Y., for appellants.

CLARENCE W. MOORE (J. E. ARMORE of counsel) for Commissioner of Patents.

Before RICH, Acting Chief Judge, and MARTIN, SMITH, and ALMOND, Associate Judges.

SMITH, Judge.

Appellants' patent application [FN1] discloses and claims polymethylol phenol, a method for producing it and a composition of it with an "alkali lignin." Claims 1 and 4 are illustrative and read:

1. The process for producing polymethylol phenol which comprises reacting phenol with from 2.5 to 3.0 moles of aqueous formaldehyde in the presence of from 0.25 to 1.0 moles of sodium hydroxide, reacting the materials at a reflex temperature to form a polymethylol phenol having a mole ratio of from 2.3 to 2.52 moles of formaldehyde per mole of phenol, cooling the mixture to arrest condensation, adding sulfuric acid and water to the mixture and keeping the temperature below 10 degreesC, separating the condensate as a heavy syrup from an aqueous portion, and washing the condensate with water to free it from inorganic material, said polymethylol phenol being insoluble in water but soluble in alcohol.

4. The resin-forming composition comprising a polymethylol phenol in the form of a heavy syrup having a mole ratio of combined formaldehyde-to-phenol of from 2.3 to 2.52 which is water insoluble containing no free formaldehyde and being free of inorganic material, and an alkali lignin which is free of inorganic material in admixture with the polymethylol phenol, said mixture being soluble in organic solvents including methanol and being condensable by heating to an insoluble, infusible resin which has low water absorption and high dielectric properties.

The remaining claims on appeal are 2 and 3, directed to the compound itself; 5 and 6, directed to the composition; and 8, directed to a process for producing the composition. No claims have been allowed.

The condensation reaction is carried to the point where the product is, in the words of the specification:

* * * water insoluble but soluble in polar organic solvents, and is advantageously useful for forming laminating varnishes, as a component of thermosetting phenolic resin compositions, as [a] curing agent for other phenolic materials, and for other purposes *401 where thermosetting condensates that yield insoluble, infusible products are useful. The polymethylol phenol is soluble in such organic solvents as the lower alcohols and is compatible with natural occurring phenolic materials such as lignin, quebracho and phenolic constituents of bark. Compositions of the polymethylol phenol and such naturally occurring phenolic materials are thermosetting and can be used to make molding compounds, and paper laminates with properties equivalent to those made with conventional phenolic laminating resins. * * *

In addition to having excellent water-resistance and dimensional stability, the products can be washed free of electrically conducting electrolytes and can thus be used to form laminates where good dielectric properties are essential.

The following references were relied upon in rejecting the appealed claims:

Amann et al., 1,614,171, Jan. 11, 1927.

Pollak et al., Re. 19,710, Sept. 17, 1935.

Thompson et al., 2,186,687, Jan. 9, 1940.

Reboulet, 2,228,976, Jan. 14, 1941.

Schrader et al., 2,620,321, Dec. 2, 1952.

Schwartzberg, 2,636,017, Apr. 21, 1953.

Dietz, 2,673,190, Mar. 23, 1954.

Shappell, 2,758,101, Aug. 7, 1956.

Carswell, Phenoplasts, pp. 9-10 (Interscience Publishers, Inc., New York, 1947).

Martin, The Chemistry of Phenolic Resins, pp. 23-24, 97, 127 (John Wiley & Sons, Inc., New York, 1956).

Application of Sandig, serial No. 368,611,

published April 20, 1943 (vested in Alien Property Custodian).

Thus we are confronted with eight patents, two texts and one published application which have been relied upon, as shall be seen, to support a myraid of rejections.

We shall rely upon the board's statement of the rejections of the various claims, since that constitutes the last official word on the subject. As to claim 1, the board said:

Claim 1 stands rejected as unpatentable over any one of Pollak et al., Ammann [sic] et al., Thompson et al., Schrader et al. [,] Schwartzberg, Dietz, Schappell [sic], or Sandig, *each alone*, or in view of Carswell or Martin. * * * [Emphasis added.]

Claims 2 and 3 were rejected as:

* * * unpatentable over the Carswell text or Martin text, *each considered alone* or in view of Schrader et al., Schappell [sic], Pollak et al., Ammann [sic] et al., Thompson et al., Schwartzberg, Dietz and/or Sandig. * * * [Emphasis added.]

Finally, claims 4, 5, 6 and 8 were rejected as:

* * * unpatentable over Reboulet *alone*, or in view of *any* of Schrader et al., Schappell [sic], Pollak et al., Ammann [sic] et al., Thompson et al., Schwartzberg, Dietz, Sandig, the Martin text and the Carswell text. * * * [Emphasis added.]

The board affirmed all the above rejections, and added the somewhat cryptic comment that:

* * * the necessity for citing so many references was in all probability brought about by uncertainty on the part of the examiner as to how the claimed compounds differed structurally from those shown in these references. This uncertainty was apparently engendered by the indefinite nature of the products, as claimed, and the further fact that appellants did not specifically compare the claimed products with the products of the reference patents under the same conditions.

We note, however, that there was no-rejection for failure to comply with 35 U.S.C. 112.

[1] We have begun our consideration of the

rejections in this case with a purely numerical analysis, and we have ended it there, for, as will become apparent, the existing situation does not permit rational isolation and determination of the legal issues which may be present. Regarding claim 1, the most reasonable interpretation of the board's statement leads to the conclusion that there is, in fact, the astounding total of *twenty-four separate rejections* of the claim. As to claims 2 and 3, there is no meaningful way to tell how many rejections have been made, because of the board's use of the disjunctive conjunction "and/or." The number of rejections of claims 4, 5, 6 and 8 is likewise indefinite, due to the use of the word "any," but the *minimum* number is eleven. A rejection so stated defeats the intent and purpose of 35 U.S.C. 132.

The form of the rejections would seem to indicate that many of the references were considered merely cumulative. And yet, the examiner's answer and the solicitor's brief describe and analyze each reference in some detail. Such a state of affairs places this court in a very real quandry. Are we to choose one individual rejection for each claim and turn the entire appeal on the *402 correctness of those rejections? Or are we to work our way step-by-step through each rejection in the hope of finding one we can sustain? Neither alternative is satisfactory from the standpoint of the public interest. Issues must be framed in the Patent Office so that we can determine with certainty the areas of our authority under 35 U.S.C. 144.

We decline to substitute speculation as to the rejection for the greater certainty which should come from the Patent Office in a more definite statement of the grounds of the rejections. To the extent the references are *truly* cumulative, the examiner or board can so indicate. If, on the other hand, all or most of the references are really necessary to meet the claims, the

rejection can be made specific as to particular references.

Unlike the board, we do not think it is sufficient justification for the actions herein that the claimed subject matter is complex. Since there is no rejection on the ground that the claims are indefinite, we can only assume that the claims so define the subject matter that a statutory ground of rejection could be made. Here, as in *In re Chilowsky*, 43 CCPA 775, 229 F.2d 457, 108 USPQ 321, a case in which this court remanded on an analogous factual pattern, "the Patent Office tribunals have not sufficiently explained the reasons for their rejection of the appellant's claims to permit a proper determination of that issue here." See also 28 U.S.C. 2106.

We are reminded of the not wholly inappropriate statement of Judge Hough in *Ball & Roller Bearing Co. v. F. C. Sanford Mfg. Co.*, 297 F. 163, 167 (2d Cir. 1924):

* * * It seems necessary to apply to patent litigation from time to time the maxim that one cannot make omelettes of bad eggs--no matter how many are used. One good reference is better than 50 poor ones, and the 50 do not make the one any better. *
* *

The case is *remanded* for further proceedings consistent with this opinion.

FN1 Serial No. 625,209, filed November 30, 1956 for "Polymethylol Phenol and Phenolic Resins."

Cust. & Pat.App.

145 U.S.P.Q. 400

END OF DOCUMENT